

POPULAR Computing WEEKLY

40p

14-20 June 1984 Vol 3 No 24

BRITAIN'S BEST-SELLING MICRO WEEKLY

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★ STAR
Dustin Dan
on Commodore 64
See page 10
GAME

News Desk



New machines at Commodore show

COMMODORE launched its two new computers, the 16 and the Plus/4, formerly the 264, at the Fifth International Commodore Show in London last week, following their introduction to the American market at CES (see PCW June 7-13).

The Commodore 16 is designed for the first time user, and will be sold in a starter pack consisting of the computer, cassette unit, Introduction to Basic part 1 and four programs, for £129.99.

The machine offers 16K Ram, with 12K Ram left to the user for Basic programming,

32K Rom, a full-stroke keyboard, and a choice of 121 colours. It runs Basic 3.5 with over 75 commands. The keyboard also features a Help key, which will highlight errors made in program lines.

The price and specification of the 16 suggest that Commodore may well intend it to be a successor to the Vic 20, but Gail Wellington, Commodore's software manager said, "As long as the Vic keeps selling, we'll carry on providing them."

The Plus/4 is designed as a machine to appeal to both

continued on page 5 ▶

Atari stars with Lucasfilms

ATARI has formed a partnership with Lucasfilms, the company which produced *Raiders of the Lost Ark* and the *Star Wars* trilogy. Two new video games produced in both company's names have been announced in the USA.

The games, *Rescue on Fractalus* and *Ballblazer*, comprise the first step towards a range of innovative games under the joint logo. They use spectacular 3D graphics, with computer generated music and sound effects, and will cost about \$35 (£25.00). Initially they will run on the Atari 5200 machine, but version for other Atari machines, including the 7800 will be produced.

It is now confirmed that the 7800 machine will be available in Britain in September, at £99.99. *Rescue on Fractalus* and *Ballblazer* should be here in November, at £24.99.

● Atari has announced drastic cut-backs in its workforce at Sunnyvale, California. Last week 700 of the 2000 staff were fired, and by July it is expected to have halved its number of employees. John Farrand, Atari president, said that the cuts were in preparation for restructuring the company.

●●●●●●●●●● **This Week** ●●●●●●●●●●

● **CES Show Report** David Kelly reports from Chicago on the Consumer Electronics show on page 19.

● **Spectrum** M Bave demonstrates text editing with the microdrive. See page 21. ● **The QL Page** Malcolm

Davidson takes on the Psion Easel and Archive packages on page 22. ● **New Releases** Brainstorm from Virgin

Games and Beach Head from US Gold are among the programs reviewed on page 56.

At £9.99 our games were a bargain...

At £6.99 they're a STEAL!!

COMPLETE THE ARCADE GAME

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CBM 64

Quest For the Garden of Eden

Travel back through time to stop Adam eating that apple!

By Bando Jones

SPECTRUM 16/48

Jokers Wild

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By Nic Ford



DRAGON

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By Tyrone Howe



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By Stuart Barnes



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Four Gates

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By Simon Wickes

PHOENIX



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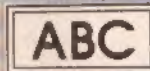
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 12-13 Little Newport Street,
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 Telephone: 01-437 4343
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Published by Sunshine Publications Ltd.



Registered at
 the Post Office
 as a newspaper

MEMBER OF THE AUDIT
 BUREAU OF CIRCULATIONS

ISSN 0265-0509

Typeset by The Artwork Group,
 55-63 Goswell Road, London EC1,
 in association with Ink on Paper Ltd.
 Printed by East Midland Litho Printers
 Ltd, Oundle Road, Woodston,
 Peterborough PE2 9QR.

Distributed by S M Distribution
 London SW9 01-274 8611. Telex: 261643
 © Sunshine Publications Ltd 1984

How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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Editorial

Argus's takeover of Quicksilver (PCW 7-13 June) marks the end of an era for the UK micro software industry.

Software was a key factor in the micro boom of the last three years. Sir Clive may have brought micros to the masses, but it was the independent software houses who made people want to buy them — if only to play games.

In 1981 many of today's top software firms consisted of no more than one or two people, operating out of a back bedroom and duplication cassettes by hand. Quicksilver, BugByte, Artic and Salamander are among those who grew with the industry to achieve their present state of pre-eminence.

But, as the software market grew in size and importance, so the bigger, more established, companies started to move in. K-Tel, Virgin, Thorn EMI, Mirrorsoft and most recently, British Telecom, have all made forays into the software market.

This move was only to be expected and has already benefited users by making commercial programs more competitive.

However, most of the more innovative software has been produced by the independent outfits, eg, *3D Ant Attack* from Quicksilver, *Jet Set Willy* from Software Projects and *Valhalla* from Legend. If enough of the independents disappear, or are absorbed by giant conglomerates, there is a danger that the resulting software will lose its spontaneity and individuality.

Next Thursday

Next week's star game is *Brickie* for BBC B by Ian Ferguson.

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Commodore

continued from page 1

home and small business users, and has been renamed to highlight the four integral software packages contained in



the Rom, according to Commodore.

The four comprise a word processor, spreadsheet, database and business graphics pack, all accessed by use of the function keys.

The machine has 64K Ram (60K free to the user), 32K Rom, full-stroke keyboard, four separate cursor keys, and, like the 16, runs Basic 3.5, and also has a Help key.

It also has a window facility whereby two of the built-in software packages can be viewed at the same time.

The Plus/4 will cost £249.00. Software for the two new

machines will be upwardly compatible, but not compatible with the 64 or Vic 20.

Commodore also announced a new range of peripherals for the 16 and Plus/4 — the MSC 801 dot matrix printer, which prints at 38 characters per second in up to seven colours at £399.99, the MPS 802 dot matrix printer (60cps) at £345.00, and the DPS 1101 daisy wheel printer at £399.99. These three are all compatible with the Vic 20 and 64.



The MPS 802 dot matrix printer

A 1542 disc drive will replace the 1541 at the same price — £229.00 — and a new cassette unit, the 1531, designed for the 16 and Plus/4 only, at £44.95.

Both the new machines and all the new peripherals are planned to be available in September.

Computers goes into liquidation

FOLLOWING the meeting of their creditors, Computers Ltd and GW Design Services have agreed to go into voluntary liquidation.

Hacker Young and Partners and Cork Gully have been appointed joint liquidators.

"The company has had talks with various potential purchasers and some have been very serious," said John Spence of Computers' stockbrokers Statham Duff Stoop. "It is simply a case of waiting and hoping someone comes up with a bid."

Keith Spencer of Hacker Young confirmed that two potential buyers had had initial discussions with the liquidators.

"In fact, up until last week someone had appeared to be ready to take over, and it is unclear why they pulled out. We would hope that they might come back to negotiate now that the company is in liquidation."

Dragon talks

SEVERAL companies have shown interest in acquiring the assets and name of troubled Dragon Data.

According to Brian Moore, Dragon's managing director, Tandy has been holding talks with Robert Ellis, the receiver appointed by Dragon to wind up the company. John Sayers, Tandy's UK managing director confirmed his company's interest in Dragon. "We have explored many possibilities and I am now talking with Tandy in the US."

The Dragon 32 and 64 machines are remarkably similar in design to Tandy's own Color Computer. Apart from its keyboard reading and interfacing, the two machines are hardware and software compatible.

Another company interested in acquiring Dragon is GEC, which already handles their marketing. Brian Moore — himself a GEC employee on secondment to Dragon — confirmed the discussions with GEC.

Imagine's games sold

IMAGINE Software has sold its software catalogue to Beau Jolly, a sister company of Nouveau Records. This is Beau Jolly's first venture into the software market.

As well as a lump sum, Imagine will also continue to get a royalty for each game sold. However, Imagine's latest games, *Cosmic Cruiser* and *BC Bill*, together with *Arcadia* and *Mega-Vault*, do not come under the deal and will continue to be marketed by Imagine.

"We will be marketing the Imagine games in the same packaging, and for the same price," said Beau Jolly's Colin Ashby, ex-managing director of K-Tel records.

"When we first discussed the deal with Imagine, our idea

was to produce a compilation pack of Imagine's games. From our negotiations the opportunity to take over their entire list came up."

Beau Jolly will be launching a 'value pack' of Imagine games in two weeks' time, which also includes *Invaders* and *3D Frogger* from Sumlock Software.

The value pack will come in two versions — a four game set for £16.49, and a six game set for £21.40 — and will be available for the Vic 20, Commodore 64, and 16K and 48K Spectrum.

"We think there is a lot of appeal in compilations," Colin continued, "and we are currently negotiating for licensing deals with several other companies."

Network link-up for Commodore 64 owners

COMMODORE 64 owners may not have access to Micro-net, but they should in the near future be able to buy a modem to link with a new network jointly set up by Commodore and ADP Network Services Ltd.

The Commodore Communications modem will link directly with Compunet, an independent system which Commodore and ADP hope will provide a shopping service, domestic and legal information, sporting services from their 'Software Park' facility and subscriber to subscriber links called 'The Jungle' to download and upload software.

The software is also protected in that a unique number is contained in each modem and included in all downloaded software. The software will only run if the number is contained.

"We're interested in anyone who has anything to sell," said John Clarke of ADP. "We have already signed up Compucard, the discount shopping service, as one service provider, and we're in the middle of advanced negotiations with one well-known bank regarding a home banking service."

"The subscription to Compunet will be free the first

year. After that, the renewal will be about £30.00, although the exact figure hasn't been finalised."

"Off-peak usage of the system will also be free, although the charge during peak times will be £6.50 — that's obviously more for business users."

Compunet will also offer a local call facility. There are 12 Compunet telephone numbers



around the country, which then link directly with the mainframe computer in London.

"We reckon we can reach 80 per cent of the population at local rates," said John.

Compunet is expected to be launched this Autumn. Orders for the modem, priced at £99.99 are being taken now, and the first batch should be available by the end of July.

Argus press

ARGUS has asked us to point out that it is Argus Press Software which has taken over Quicksilver, not Argus Specialist Publications.

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Letters

Good morning, campers

May 1, through your magazine, thank both Paul Barnard and his assistant Tony, who run a great computer course at Butlins Holiday Camp, Skegness. I so enjoyed it I spent a second week with them and would recommend the course to anyone.

R Harding
12 Whitchurch Avenue
Exeter
Devon

Tentative bid

I am preparing an article for an international Bridge magazine describing the bridge software available for home computers. If any of your readers have written a bridge program for any home computer, I would be pleased to hear from them.

I. S. Aldridge
6 Priors Road
Hemingford Grey
Huntingdon
Cambridgeshire
PE18 9BT

International user group

Maybe you would be kind enough to mention Club64, which could be best described as an international Commodore 64 software user group, in a future edition of your publication.

As we have not yet fully decided the range of services that we should offer to our members, we are seeking constructive suggestions. It should be mentioned that we have a particular interest in hearing from users who cannot attend club meetings because they are living in remote parts or because they are disabled or even because they do not have the time. It should also be noted that, as a huge selection of educational software has been made available to us, we would be very pleased to be contacted by teachers or edu-

cational organisations.

We have already established a library of high quality public domain programs, most of which have been checked and debugged. At present 10 discs are available and every one of them includes between 10 and 15 programs which may be copied and distributed to friends, members of user groups, schools, etc. We hope to add at least two discs per month and maybe, if we get enough suitable material, issue a regular newsletter on disc.

All 64 users, in all countries of the world, with disc drives are invited to make use of our library. For anyone who only wishes to use the library there will be no membership fee, but there will be a fixed charge per disc obtained from the group but this will be kept as low as possible.

As we are a non-profit making group we do not, at present, have the manpower or resources to enable us to make programs available on tape but if the demand is great enough for such a service we will try to find a way.

We are interested in obtaining news, information, product details, programs or any information suitable for inclusion in our proposed newsletter.

Brendan Conroy
Club64

85 Upper Drumcondra Road
Dublin 9

Guaranteed keyboard

Nearly 10 months after buying my Spectrum the keyboard has gone wrong. The keys from B to Symbol Shift don't work when they are pressed. I took the computer back to the shop I bought it from and they advised me to send it back to Sinclair myself. So on the 29th of April I sent it away. I was very happy when on the 29th of May it came back in the morning post — that was until I opened it. Inside was a photocopied letter saying:

"We regret that it is necessary for us to return the enclosed equipment as it was not purchased by mail order direct from ourselves. We must advise you to refer this matter to

your original supplier." And scribbled underneath in biro was:

"If you have any difficulties in having it repaired we can offer you a repair for £30.00."

Check — since it is still under guarantee. I was wondering if I bought a proper keyboard (I've always wanted one and they cost about £30) and connected it to my Spectrum would the keys from B to Symbol Shift work on it?

David Brown
The Old Manse
Trewellard
Nr Penzance
Cornwall TR19 7SW

PS. Keep Microradio and preferably expand it to about four pages (or more).

The answer is probably 'Yes'; since most keyboard faults are due to poor contacts, a new keyboard may well solve the problem.

Memotech owners club

We are writing to inform you of the formation of the Memotech Owners Club. We feel that to use this machine to its full potential, an interactive link between the owners is necessary, and we aim to provide that link. Anyone interested in joining should send an SAE for details.

Richard Adams
Philip Ayres
23 Denmead Road
Harefield
Southampton SO2 5GS



"Graham can get Prestel and Micronet on his Spectrum and I can get Compunet on my Commodore — but we've only got one phone!"

Our mistake!

On page 50 of your issue Vol 3, No 22, you feature *White Knight* in the BBC software chart, but wrongly attribute it to Acornsoft. Can you please either publish this letter or otherwise say that this is published by BBC Publications.

The program can be obtained from us, price £11.50 inclusive of VAT.

David Atherton
Software Manager
BBC Publications
35 Marylebone High Street
London W1M 4AA

All in the service

A few days ago I discovered a bug in *Flight Simulation*. I telephoned Psion (just as a matter of interest) to see if they knew about it, and they told me that I must have an old copy as that bug had now been rectified. They asked for my name and address and told me that a new copy was on its way. This was at 5.00pm.

It arrived at 8.00am the next day, Psion having forked out 28p for postage. Bent that for service.

N Foster
12 Middlefield Lane
Hinckley
Leics

A small error

May I start by thanking you for publishing some of my Commodore 64 programs over the past weeks. Unfortunately, a small error has crept into the listing of the latest program, on page 30 of Vol 3, Issue No 22. As published, line 530 reads:

```
530 IF BEQ=<=FIN THEN GOTO 1080
```

This should, of course, read:

```
530 IF BEQ=<=FIN THEN GOTO 1080
```

I offer my apologies for any inconvenience this may have caused.

Adrian Warman
Dorset

the LLAMA has LANDED!

..... and it's breeding fast.

Once upon a time, only Commodore owners could experience the thrill of playing an original game by Jeff 'Awesome' Minter. Lesser mortals could only sit and stare in wonderous rapture at the furry arcade action brought to you by Llamasoft.

BUT NOW THERE IS HOPE.

Dragon owners were the first to see the light of day, but now Salamander Software is pleased as punch to announce that selected titles **ARE NOW AVAILABLE FOR THE 48K SPECTRUM.**

Yes that's right, Salamander is now producing titles for the Spectrum, and the first of these are two great arcade games.

METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

On a forlorn observation post at the edge of the galaxy, the Metallamas wait for a sign of Zzyvaxian spaceships. Suddenly the alarm claxons blare, and the furry friends of freedom rush to the fore only to find that there are no attacking spaceships, and that they are under attack from Cyborg Arachnid Mutants and Disgusting Weeviloids.

This classic arcade game, originally developed by Jeff 'Awesome' Minter of Llamasoft, features 1 and 2 player options, spitting Llamas, Cyborg Arachnid Mutants, Disgusting Weeviloids, 99 levels of play. Joystick recommended. Supports Spectrum ZX Interface 2 and Kempston joysticks.

MATRIX: GRIDRUNNER II

It is ten years after the infamous Grid Wars, and humanity is once again threatened by the evil droids, only this time they're back in force with new weapons and new allies.

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Game originally developed by Jeff 'Awesome' Minter of Llamasoft. Joystick recommended. Supports Kempston and AGF joystick interfaces. In space, only the camels can hear you scream.

What some famous people have said...

"What's an arcade game

"Awesome"

"I prefer elephants"

"Don't shoot me, I'm only the piano player"

"Boing"

Aristotle

Jeff Minter

Hannibal

Elton John

Zebedee



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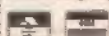
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Signature

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Dustbin Dan

A catchy new game for the Commodore 64
by Stuart Myler

The object of the game is to catch the fruits as they fall from the fruit factory. If you miss three fruits, you die of starvation.

Use the cursor keys to move right and left, and press the space bar to catch the fruit. Take care to hit the space bar before the fruit lands on you, or it might slide down to one side.

Program notes

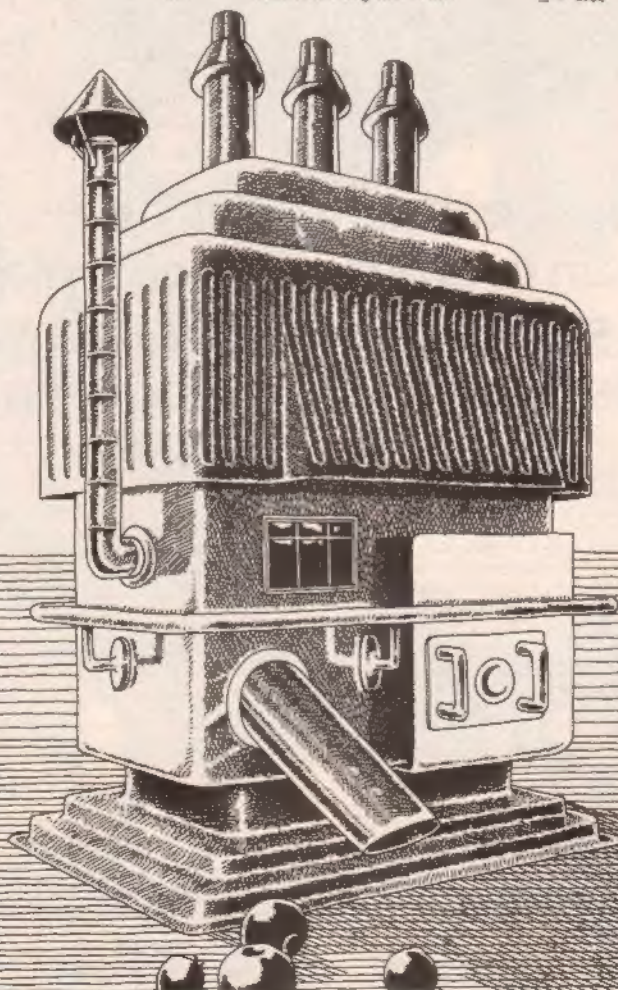
6 Clears screen and turns off sprites
8 Disables Commodore Key and put into upper shift mode

10-15 Reads sprite data
16-80 Turns on sprites, colour them, etc.
100 Sets variables
150 Makes keys repeat
160-170 Sets sprite positions
175-181 Sets sprite data
199 Beginning of main program
200 Sets pace of falling fruits
205-207 Sets sprite data for bin
240-250 Sees if key has been pressed
350-357 Sees if a fruit has been caught
360-362 Sees if dustbin is at the beginning or end of screen
365 Decreases falling rate of fruit

370-375 Sees if fruit has been missed
389-392 Prints sprites on screen
1000-1050 Prints board on to screen
5000-5340 Sprite data
6000-6060 Sound for a miss
6100-6160 Sound for a catch, and prints score
9000-9105 Displays board
9200-9260 Instructions

Variables

■ = score
H = hi-score
X,Y = position of Dustbin Dan
N,M J,K = position of fruit
■ = lives




```

1 REM *****
2 REM ***** DUSTBIN DR *****
3 REM ***** 37 *****
4 REM ***** S.MYLER *****
5 REM *****
6 PRINT "***** POKES3269.0 GOTO900L
7 PRINTCHR$(9) PRINTCHR$(142)
8 REM ***** WRITE INFO *****
9
10 FORH=0T062 READH POKES32+N.R NEXT
11 FORH=0T062 READH POKES36+N.B NEXT
12 FORH=0T062 READH POKES38+N.C NEXT
13 FORH=0T062 READH POKES1223+N.D NEXT
14 FORH=0T062 READH POKES1228+N.F NEXT
15 FORH=0T062 READH POKES1230+N.E NEXT
16 V=3249
20 POKEV+16.0
30 POKEV+21.7 POKEV+28.2
40 POKE2040.13 POKE2041.15
50 POKEV+39.11 POKEV+37.5 POKEV+36.2 POKEV+40.7
53 POKEV+27.0 POKEV+29.1 POKEV+25.0
60 POKEV+1.16 POKEV+100
70 POKEV+2.0 POKEV+3.0
80 POKEV+4.0 POKEV+9.0
90 GOSUB1000
100 S=0 L=3 O=3 H=13
110 POKE650.122
125 GOSUB6155
160 Y=210 X=100
165 N=POKE(1)*255 N=POKE(1)*100
170 J=POKE(1)*255 K=POKE(1)*100
175 J=INT(N/POKE(1)*100)
176 IFJ=0THENH=191 O=5 G=0
177 IFJ=1THENH=205 O=6 G=0
178 IFJ=2THENH=192 O=7 G=4
179 POKEV+41.0
180 POKE2042.E
181 POKEV+23.0
182 GOTO360
189 REM ***** MAIN PROG *****
200 N=H L=K M=L/POKE(1)*100
205 POKE2040.W
206 IFM=14THENH=12
207 N=H L=K
220 POKEV+41.0
230 GETA$
250 IFH=M THENH=H+13
260 IFH=M THENH=H-13
270 IFH=0 THENH=H+1 THENH=H+1 L=L+.6 K=POKE(1)*250 K=POKE(1)*100
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995 IFH=0 THENH=H-1 THENH=H-1 L=L+.6 K=POKE(1)*250 K=POKE(1)*100

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Olympian

The *Olympics 84* software package consists of two cassettes plus a 28 page booklet. It gives you not only a light hearted introduction to the history of the modern Olympic Games (this makes up just over half of the booklet), but also two database programs — the first allowing you to select and view the results from all past Games and the second, for use this summer, allowing you to enter this year's performances.

In operation, the database handling program turns out to be inflexible, limited, and not very user friendly. It made me pine for the possibilities of any of the general database programs around. *Olympics 84*

does use bar charts to display some of the results, which is a good idea, but without any indication of scale.

The historical database seems to be full and comprehensive, although it is rather limited by the memory required for this task, and does not include all the information you might want, such as the names of winning competitors. The Input database is for use by very keen Olympic followers, who are committed enough to enter this year's results. This program does include names of competitors, but has historical information on the last two Games only.

Technically the program works well, and seems to be bug free. The author is a competent programmer, and has used good techniques of

data compression to store the information: the problem is in the sheer volume of information to be stored. There's a missed opportunity here; the program is copyrighted 1983, and so was probably well on the way before the first Microdrives came out, but we're still waiting for a program that will use the facilities offered by the Microdrive to store and retrieve large quantities of information.

As it is, we have a program that's interesting to use, but will appeal, I suspect, only to the very keen Olympic followers, who will want to use the input database.

Simon Sprigler
Program Olympics 84 Price £14.95 **Micro Spectrum Supplier** Storm Software, Winchester House, Sherborne, Dorset.

Shoot on sight

It has always seemed to me that computer games tend to lose a great deal in conversion to other computers. As I loaded *Matrix* into my Spectrum, I hoped that this would be different, but my fears were realised. Jeff Minter is something of a cult star to Commodore owners, renowned and widely acclaimed for his innovative fast action games. These are ideally suited to Commodore computers, with their games

orientated sound effects, but do not suit the Spectrum with just the odd *Beep* here and there. The game is a very damp cloth by comparison with the original.

Having said that, the game is a perfectly respectable version of *Centipede*. The idea behind the game is simply to shoot just about everything on the screen. Graphics are not brilliant — a grid forms the basis for the screen display, along whose rows swarm segments of a centipede. Unfortunately, the nature of the game prevents use of anything other than single character graphics, which gives the impression that

the game is less professional. (I have a suspicion that, even though the programmer clearly wanted to do as direct a translation as possible, he could have included sprite-type graphics: the game would have been helped no end if he had.)

While I liked this game, it somehow didn't have any addictive quality to bring me back to the screen again. There are probably better all-action games readily available for the Spectrum.

David Lester
Program Matrix Price £5.95 **Micro Spectrum Supplier** Salamander Software, 17, Norfolk Road, Brighton, East Sussex.

In motion

If there was a prize for the silliest name ever given to a computer game then *Wallie goes to Rhymeland* would stand an excellent chance of winning it. The reason for the name lies in the rhyme on the cassette cover, which describes the game in verse.

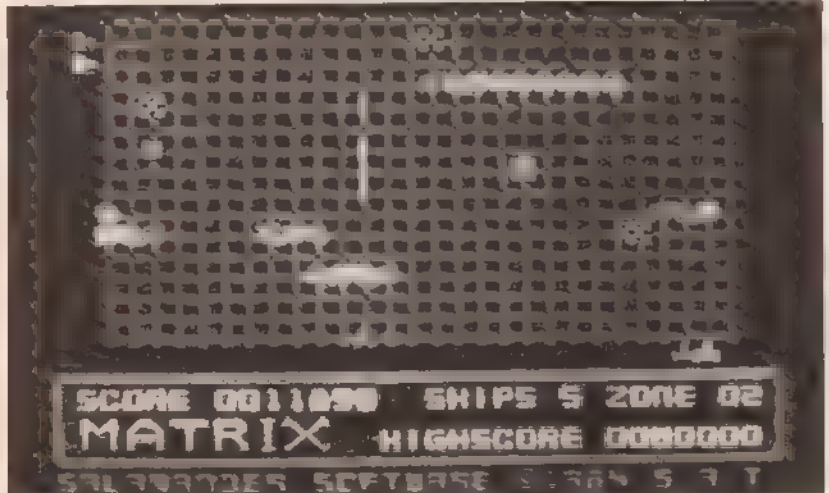
The main character is *Wallie*, shaped like a yellow egg with red legs and a huge mouth which is continually in motion as he chews gum all the time. He has to make his way through the story described in



the verse, involving such other characters as *Humpty Dumpty*, *Bo Peep*, *Little Miss Muffet*, and others less familiar, while avoiding assorted hazards. For example, burning pits, deadly raindrops, arrows, guardsmen, and many others. *Wallie's* only defence against all these perils is his chewing gum, which he can spit at his assailants with lethal effect.

The game itself is well programmed with good sound and graphics. Despite the nursery rhyme level of plot, the action is anything but kindergarten stuff — it is pretty tricky, often requiring very quick reactions. Nevertheless, this is one of those games which you keep coming back to after every failed attempt (and there will be plenty of these) if only to try to find out what is going to happen next.

Richard Corfield
Program Wallie goes to Rhymeland Price £7.00 **Micro Commodore 64 Supplier** Interceptor Micros, Lindon House, The Green, Tadley, Hants.



Black wizard

It is unusual to find arcade-style games with a historical setting, rather than doing battle with futuristic aliens in a distant corner of the galaxy. However, *Cavelon* from Ocean Software is one such game.

The rather odd name is presumably a hybrid of Camelot and Avalon, intended to evoke the era of chivalrous knights and damsels in distress, since this is the period in which the action is set. Here you have to guide the knight through six floors of a castle in order to reach the imprisoned damsel. However, on each floor you must collect the pieces of the door to the next level in order to progress. Unfortunately, the castle is patrolled by knights and archers whose purpose is to stop you. If you manage to get through all six floors you finally have to do battle with the Black Wizard before your mission is complete.

Each floor of the castle is



maze like and it scrolls horizontally as you move across it. An increasing degree of skill and ingenuity is required to complete each level. Overall, it is an interesting variant on a well-tested theme.

Richard Corfield
Program *Cavelon* Price £6.90
Micro Commodore 64 Supplier
Ocean Software Ltd, Ocean House, 6 Central Street, Manchester 2.

Rocky caverns

One arcade game which achieved widespread popularity and success was *Scramble*. Not surprisingly many versions of this game have appeared for home micros, and Rabbit Software have just re-



leased yet another for the Commodore 64, called *Scramble*.

However, this is not just another version of *Scramble*, it is the best I have yet seen for the 64. It consists of the stan-

dard plot in which you pilot your jet fighter over mountainous terrain, through rocky caverns and over enemy cities while dodging or destroying the heat seeking missiles, meteors, fireballs and space monsters. You have a limited supply of fuel but this can be replenished by bombing the fuel dumps on the ground. There are also some original touches, like hostile tanks in the cities which keep up a continuous barrage of shells. The game can be played using either keyboard or joystick.

Overall this is a very exciting game, making excellent use of graphics and sound, and while it may not be original, it faithfully reproduces all the qualities of fast action and variety of challenge that made *Scramble* such a successful arcade game — after all, why change a winning formula? I, for one, thoroughly enjoyed playing it, and other *Scramble* fans probably will too.

Richard Corfield
Program *Scramble* Price £5.99
Micro Commodore 64 Supplier
Rabbit Software Ltd, The Warren, Unit 11, Forward Drive, Wealdstone, Middlesex HA3 8NU.

Flying dinosaur

Borzak, the "Amazing Bug-eyed Beastie From Betelgeuse", despite its ridiculous, but admittedly original, title is an interesting variation on *Moon Buggy*, in that you have to travel along the screen horizontally, jumping over gaps in the ground, and at the same time coping with numerous hazards overhead.

Having said that, however, it is different enough to be enjoyable, and has absolutely amazing graphics — the atten-



tion to detail is quite something, especially with the game's hero, *Borzak* — he must need at least ten character squares, and is well animated, too. On his/your journey through the marsh in search of a spaceship, you encounter quite a selection of opponents, or problems. For example, even on level one, you have to

be careful about jumping over the holes in the ground, otherwise you tend to get destroyed by a small flying dinosaur (only small in relation to you).

There are a large number of levels to contend with, each having the same idea but with different difficulties for you to overcome. One nice feature is that you can select which level you wish to start at before every game. The game supports joysticks, if you have one, and also offers a sensible selection of keys (this is important as there are quite a few, what with different types of jumps and changing speed, etc.).

The game is pleasantly packaged in a small video-style case, but unfortunately you pay for that — the game is a trifle overpriced at £6.95, I feel.

David Lester
Program *Borzak* Price £6.95
Micro Spectrum Supplier
Channel 8 Software, 51 Fishergate, Preston, Lancs.

Killer moths

Somehow the thought of killer moths invading earth sounds a bit far out even for a computer game. Yet, if you think of some horror films which have included everything from killer caterpillars to killer birds, then I suppose killer moths (I'm glad it wasn't killer butterflies) seems OK.

Superior Software's *Alien Dropout* is an opportunity to kill hundreds of beautiful moths, whilst at the same time dodging the giant moth's killer bombs (or droppings?).

The moths are threatening Earth. The small moths fly into their boxes in sequence. As

each of the 10 boxes is filled a moth is released, and it will attempt to destroy your laser.

The large moth in the middle is usually indestructible, but if you manage to kill 200 of the small moths, the large moth will be released. If you destroy the large moth, a new set of more powerful moths will come into action.

Alien Dropout is, again, a variation of the space invaders format, but I found it fun and a game which extracts every ounce out of the Electron's speed and sound capabilities.

Fred Short
Program *Alien Dropout* Price £6.95
Micro Electron Supplier
Superior Software, Regent House, Skinner Lane, Leeds.

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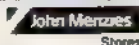

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CES Show report

Windy City

David Kelly presents the first of two reports from the giant Consumer Electronics Show in Chicago

Chicago — home of the world's tallest building, the world's tallest bank, the world's tallest apartment block and the world's tallest Italian marble clad building — played host last week to CES. CES is a giant trade showcase for the electronics industry. The 689 pages of the exhibition guide list over two thousand exhibitors.

Thankfully, only around 300 of these are computer stands — even so, the scale of the event is frightening. For the start of the four-day show on June 3, Chicago was besieged with over 100,000 visitors come to spend "their time and their money" in the town.

Probably the most important lesson to be learned from CES is that little that is going on in the UK computer world has any relevance over there. The British industry is determinedly marching out of step — and nobody wants to know about it.

Where there is any awareness of the British scene, it is either regarded as a curiosity — a glitch in the proper order of things — or clouded by much ignorance. Most are shocked and uncomprehending when told that the top UK micro is the Spectrum.

It is fascinating to compare the American market with the British one. In the US, the battle has been won and Commodore is the victor. The company completely dominates the home computer market with over 60 per cent of the low-cost micro market. The others have either dropped out, like Timex or Texas Instruments, or they look in poor shape, like Atari.

Commodore's only competitors in the home micro market are Apple and IBM. Both the Apple II family and the IBM pc

and PCjr are regarded to an extent as home machines. Consequently, there was a considerable quantity of games and recreational software on show for these machines — some of it like *Karateka* from Broderbund for the Apple of tremendous quality. It seems strange — from the perspective of a UK visitor — to think of either the Apple or IBM machine as a home computer. Yet the Americans earn rather more than us — the average wage over there is around \$44,000 (about £30,000) and the cost of living is not that much more.

This corresponding increase of purchasing power is reflected in the fact that cassette software is a complete no-no. Everything is either on disc or cartridge for around \$35 (£23).

It then becomes obvious why Atari has done badly in the UK — who is going to pay £35 for an average game title in Britain.

It is quite instructive to look at the way Commodore has had to change for the UK market. It has been forced by Sinclair to initiate its own UK software publishing outfit — on cassette — and to look intelligently at the UK market and compete with Sinclair head on. A mark of flexibility — it is no wonder then that in the US Commodore is beating everyone else out of sight.

With only one company in the low-cost home market, the American scene appeared to me to be rather flat — without the excitement and confusion of the UK.

Bearing all this in mind then, it must be seen as an extremely courageous move for Sinclair to exhibit at CES. Where were the others? Where was Acorn and Oric? Come to that, where were all the other European manufacturers — Phillips, Thompsons and Triumph? Even the Japanese giants — JVC, Panasonic, Sony and Mitsubishi — shied away from pushing MSX onto the US market. Only JVC showed its MSX computer and that in the context of proving the depth of products produced by the company.

MSX certainly won't go on sale in the US this Christmas. In fact, despite behind-the-scenes discussions between Microsoft's Bill Gates and the Japanese companies, it looks as though America will never see the first incarnation of MSX. In Christmas 1985 they may get MSX II and that may depend on how MSX performs this Christmas in Britain. The message that comes across loud and clear is that the UK is being used as a test launch.

The American market is huge and there is a substantial anti-Japanese import feeling in the US. Hard-bitting comparative TV advertising displays a US product alongside its Japanese counterpart "Better than this Japanese import — and better than this Japanese import. Fighting back against the Japanese".

All of which gives Commodore a free run — for this year at least. The considerable efforts from US software houses like Sierra, Broderbund, Electronic Arts Activision, CBS

and Parkers are being directed at the Commodore machines.

Commodore's new machines — the Plus/4 and Commodore 16 should be out on the US market by September and October respectively. The Plus/4 will be priced under \$300, the Commodore 16 under \$100. Both are based on a processor chip developed from the 6502 which makes the conversion of Commodore 64 titles to the Plus/4 a doddle.

If there is any question mark over the Plus/4 it is its similarity with the 64. In many ways it is Take #2. The Plus/4 is billed as the 64 was originally intended — as a machine with serious application. In fact Commodore has invented a new word to describe the machine — the Plus/4 is a 'productivity' computer.

It will come with four software titles built in on ROM — each a mirror of the packages on the QL. A word-processor, a graphics package, spreadsheet and file handling. They are not a patch on the Psion packages — taking up 32K instead of around 320K — but the QL will have a gruelling uphill struggle for acceptance in the US where the first question is "If it's not Commodore, is it Apple or IBM compatible?"

The Plus/4 may not hold a candle to the QL, but it is over \$200 cheaper. Admittedly, the QL has twin built-in microdrives, but this is almost viewed as a disadvantage.

Commodore announced a new disc drive at CES. It is disc compatible with the existing 1541 drive, but the new SFS 481 unit is around five times faster with parallel data access rather than serial.

There are definite rumours however that Sinclair has not finally settled on microdrives for the US — or the UK for that matter. Sony with its 3 1/2 inch drive persistently crops up in this context.

Commodore's dominance in the US is daunting and Sinclair seems to be the only company apart from Atari still in there. Both the QL and the Plus/4 are planned for sale in the Autumn. But the Plus/4 will be in all the retail outlets and the QL will be mail-order only.

Next week a detailed look at software at CES

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Text book copy

M Bave presents a text editing and assembly program for use with Microdrive and printer

This is a text editing and assembly program for use with the microdrive and printer. It is written entirely in Basic and therefore can be tailored to individual needs. The text can be written, edited or called from previously held files (even in the middle of writing) or stored into files — also it can be moved around from page to page or within a page.

The text is input from the *Inkey\$* into *i\$* and finally assembled into *q\$*. The program responds to all of the keyboard in "L" mode, except for the caps lock which has been moved to the graphics mode key. Pressing 'enter' will put the program into 'options' mode, which has the following functions:

Start new line
Erase current line

- Erase entire text
- Insert text
- Delete part of text
- Move entire text back one space
- Store current text in microdrive
- Load file from microdrive and insert into current text (if any)
- Lprint sends text (qS) to printer
- Move section of text to another place within text
- Review points on screen all pages currently in text

When deleting, moving or inserting text, the program changes the paper colour from the start of the selected page until a key is pressed. If inserting text, the program will wait for input at the point where the key was pressed. If deleting, it will then continue by overprinting inverse characters until another key is pressed — all characters printed inverse will be deleted.

When moving text, the program follows the deleting routines. It saves the text in *p\$* and then follows the insert routine to complete the move.

Notes

10-60	set up new text and main input loop
70-140	subroutines to service main loop
150-370	routine for selecting options
380-410	insert text routine
420-470	delete text routine
480-520	store text in microdrive file
530-580	load previously stored file
600-690	start new line and erase current line
700-810	move block of text
900-920	printer output
1000-1040	subroutine for insert, delete, move
8898-9999	saves program on microdrive

As I have used control codes for colours which do not print on the ZX printer, you will have to amend these lines as necessary:

90 the space " " should be green paper white ink
and flashing
140 the space " " should be magenta paper white ink
and flashing
1020 the space " " should be cyan paper white ink and
steady

```

1 RE  MORL 5 1254 H.R.DAVE
2 CLEAR LET 0000 LET N06
3 21253.0 0000 23561.20 0
4 5 LET 41 0000 0000
5 0000 0000 0000 0000
6 0000 0000 0000 0000
7 0000 0000 0000 0000
8 0000 0000 0000 0000
9 0000 0000 0000 0000
10 0000 0000 0000 0000
11 0000 0000 0000 0000
12 0000 0000 0000 0000
13 0000 0000 0000 0000
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100 0000 0000 0000 0000

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100 LET S9999 TO 0 LET P999
110 LET INPUT TO 0 LET Q9999
120 GOTO 40
130 GOTO 40
140 GOTO 40
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A slice of the cake

Malcolm Davison continues his examination of the Psion QL packages by looking at Easel and Archive

The problem with business graph drawing packages hitherto is that they have been difficult to use, expensive, not interactive and there have been problems in tailoring the packages to the wide ranging specifications of the micros on the market. *Easel* is a very ingenious piece of software. The speed with which you can tailor a full-colour graph to do a particular task, and the appearance of the result, provides better facilities than you will see on any other business micro.

Giving the graph a new appearance depends solely on one command — *Change*. This gives you a number of factors that you can alter.

Firstly, you can alter the format, that is the style of graph. You can opt for a horizontal bar chart, a line chart, horizontal bars, pie chart — in all, eight different types. You can select the type of bars from 16 options and style of axes from a display of nine. There are 16 defined line styles and, if you are not happy with any of these, you can even design your own.

Pie chart segments can be customised to colours of your choice, as can any text you add to the graph. A number of enhancements are available, including adding a key box, and highlighting of significant figures. In the case of a pie chart, a segment can be offset from the rest of the pie.

Once you have designed a graph, feeding in data is simply a matter of targetting a column with a crosswire, using the cursor keys or the tab key, and entering the appropriate figure. Selection of design options is a similar 'target your choice' method, it's a bit like playing 'Golden Shot'!

Once the data has been entered, the graph bar will immediately appear and scaling is automatically catered for. New graphs can be drawn on the basis of two sets of data and a mathematical formula can combine the two to create a third set of figures. So, projected profits figures, for example, can be derived and plotted from production costs and scales.

It is easier to learn to use this program if you already have a working example — and you can amend it. But, on loading the program, you are presented with just the axes of a blank graph.

Pie charts are very slow to draw and each change requires a re-draw, making it a very slow process. It would have been useful to have a drawing/no draw option to speed the process up a bit.

Reproduction of graphs is problematical — but with colour ink jet printers on the market, this will soon be a problem of the past. For the moment, however, the QL is configured to work with the Epson FX-80.

The data for *Easel* can be imported from

Abacus and *Archive*, and the output from *Easel* can be included in *Quill* word processed documents using the *Export* command.

There are not many ways you could improve on this package. A choice of typefaces would have been welcome too, as would 3D graphs, but then we should be thankful that any software has been included in the price of the QL at all! Well done Psion — well done Martin Brown, the program's author.

Archive

The program *Archive* is the most complicated and powerful of the four applications. While it offers a simple means to set up databases and to subsequently access, select, and print out records, its main strength is its ability to use a language to specially tailor applications around the databases. The program has to provide program line editing, screen layout and design as well as database handling facilities.

It is surprising that Psion should choose to produce a *dBase II* look-alike — programs as complicated as this takes some time to develop, and like port they take time to mature. *dBase II*, which is the market leader and has held this unassailable position for the last four years, is considered by many a difficult language to learn.

Although Psion have greatly simplified the programming of a database management system, much of the potential power of the query language commands has been left untapped. Consequently, you need a number of commands or special procedures to be written to do the most routine of operations.

To offset this somewhat, the creation of a new database and the addition of data is very straightforward. Call your database a name, and name the fields — the only

complication is that, like Basic, you must distinguish string fields from numeric using a dollar suffix on the name. Unlike other systems, you do not have to define the lengths of fields nor be troubled by a range of data types.

Data entry can begin after typing the word *Insert*. A standard screen layout offers a means to type in the information. Full control over editing the data before committing the record to the file using function key 5 is available. Unfortunately, the system breaks down when you key in records greater than the line length of the screen and a second record picks up the tail end of the previous record.

There are problems too if you want to have more fields than the number of available lines on the screen — the only way round this is to define your own screen entry format. The lack of immediate help that you experience if you opt to use the whole screen for input is frustrating for a new user — switching between modes of display while trying to enter data throws the screen into disaster.

Editing a data entry screen is not as simple as it could have been. In addition, there are no column or row positions in order to reconstruct a screen layout, a fact that will cause problems for book authors.

Once the record is in the file, the commands *Back*, *Next*, *First*, and *Last* display the relevant records. If you know the number of a record, you can type the command *Position* and the number will access the appropriate record.

The program includes a gazetteer database which provides a useful way to practice the query language syntax. And, unlike many database packages on the market, the example database is a sensible length.

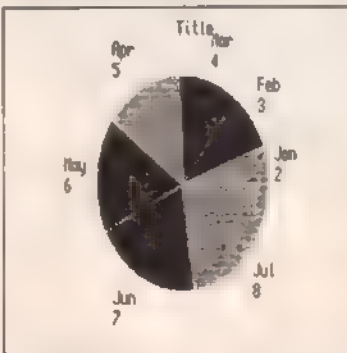
The command set sports a very straightforward and all embracing *Find* command, which will hunt for any like piece of text anywhere in the file regardless of the field or record it is situated in. If you know which field the text is in, then a *Search* command will track it down.

The command words such as *Position*, *Display* and *Select* are long words to type when you are using them on a regular basis. It is possible to write small procedures to handle each of these, so a single key depression will do the job, but then they clutter up your own procedure area.

The reporting facilities of *Archive* are very limited. A *Dump* command heads the columns of data with abstruse field names instead of intelligible headings. It also crashed on me on one instance, so you could say it was living up to its name!

dBase offers a very powerful command called *List*;

LIST name, salary FOR salary >5000 AND salary <10000
which is intelligible even to the non-user. *Archive* would require a *Select* command and then a *Dump* instruction followed by a *Reset*. The problems are even more



A pie chart

complicated when you want to delete a batch of records, or you want to merge two files or create subset files — special procedures have to be written to cover each of these eventualities.

Programming with Archive

It is not just coincidence that the programming facilities so closely resemble those of SuperBasic — and this will greatly assist most users in tackling Archive programming. The introduction of procedures into Sinclair's Basic will greatly help those learning Archive, as Goto statements do not exist, and the writing of small procedures is an integral part of the Archive programming concept.

The procedure editor, or program line editor, if you prefer, is a very clever set of tools that could still benefit by further enhancement. As with SuperBasic when you type in a line, the program then adapts it to a standard form of presentation, checks on syntax, and then adds it to the program. Logical areas of the program are automatically given indents, so that errors in logic become more apparent.

New lines can be inserted, old lines may be deleted singularly or en masse using the Cut command and may be simply added elsewhere in the procedure or in another procedure using a Paste command. This

Cut and Paste facility does not allow you to duplicate areas of coding or to store a dictionary of useful routines — more's the pity. Movement up and down the program is acceptable with the cursor keys, but a 'page hop' facility would have been welcome, as up to 255 lines may be built into any one procedure.

By pressing function key 5, you can edit the current line; however, this line can on occasion bring in rubbish from the data buffer, which is a little disconcerting. The syntax checker will sometimes reject a bad line, but this will lose all that you have typed as well as losing your place in the program — not very friendly! Replacing a long line with a shorter one can cause disarray on the screen, but the screen cursor movement clears the problem.

The best part of the procedure editor is the instant availability of the other procedures — movement between the procedures using the TAB key was a luxury I have not been used to, and greatly speeds program development. Listings of the program can be easily produced by typing List, but you get all the procedures currently in memory printed out rather than just the one you are working on.

Procedures held in the memory are not stored to the Microdrive automatically, which saves frustration and delay while they are accessed, but can prove hazard-

dous if you don't regularly save the program. Program testing can, on occasion, cause Archive to crash and your program could be lost forever.

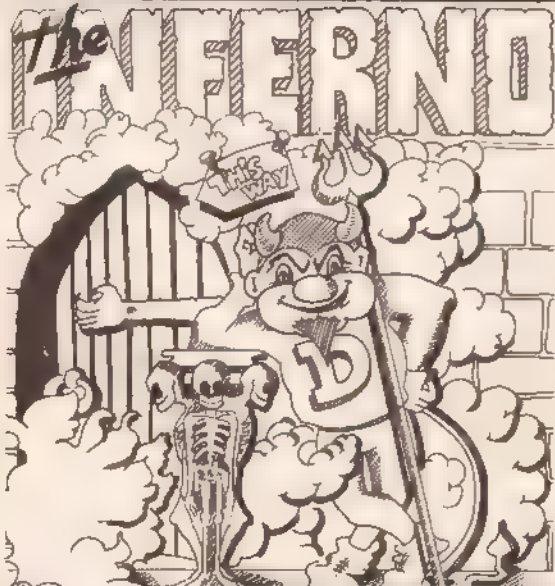
Happily, crashing is not a frequent occurrence and the Escape key will get you out of program loops, input statements and anything I cared to throw at it.

I miss a command to print out all the values of the current memory variables, a command to print out the format of your file, a command to print the current record on a printer and a pause command as in SuperBasic. To its credit, the program has an excellent Trace command which can quickly track down any problems in your procedures. The program, as with all the QL application packages, has a comprehensive series of help screens, which can save a lot of searching through the manual.

Multiple file operations should be straightforward, but in practice are less so. In testing a multiple-file procedure, inevitably the program can fail after opening its files. Having corrected your mistake, you have to religiously close your files before re-running. A procedure may be set up to do this, but closing files takes quite a bit of Microdrive.

In all, Psion have got a very powerful system into the QL. While it lacks many refinements, in the main they can be programmed around.

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Keyed in notes

Joseph Burr explains how to turn your Dragon into a musical keyboard

This program turns your not so humble Dragon into a musical keyboard. The program is written in both Basic and machine code. This allows the user to retune and adjust the keyboard, without an assembler or any knowledge of machine code.

To use the keyboard, the Basic program is first typed in and saved at the beginning of a blank cassette. Then follows the machine code, using an assembler, or Listing 3 if an assembler is not available.

To load the keyboard *Cloud* is entered

followed by Run when OK appears. The tape recorder is left playing. When it has loaded, the keyboard layout will be displayed.

Listing 1 is the assembler listing, the 'E' is the sharp or hash sign (#). The explanations of the program's workings are included to the right of the listing.

Listing 2, the basic part of the program, displays the keyboard layout and stores the necessary note frequency and keyboard scan information. This is stored in blocks of three. The first is the time lag between the alternate peaks and troughs that go to

make up a sound wave. Increasing this value will lower the note, decreasing it raises the note. The next two numbers are for the keyboard scan which is explained in Peter Chase's article (*Popular Computing Weekly*, May 26 1983).

Listing 3 is for Dragon users without assemblers. It can be used to load the machine code given in Table 1 into the computer's memory. The *Dream* editor/assembler was used, so the machine code starts at 20001, but the program is relocatable anywhere in the Dragon's memory, as long as the *Execute* statement in line 190 in Listing 1 is suitably doctored. This is saved by: *Csaven/Synth*, 20001, 20166, 20001.

I would like to thank Nicholas Brown for help in tuning the keyboard, and to Saint Peter's and Marrow Grange School for the loan of a set of tuning forks.

Listing 1

LDA	65315	(		LDB	65280	(
ORA	E8	(	SET	ANDB	E127	(	SEE
STA	65315	(		PSHS	B	(
LDA	65281	(	UP	CMPL	,S+	(	WHICH
ANDA	E247	(		BEQ	LOOK	(
STA	65281	(	SOUND	CMPL	E0	(	KEY
LDA	65283	(		BEQ	ADD	(
ANDA	E247	(	CHANNEL	CMPL	E1708	(	IS
STA	65283	(		BLT	AGAIN	(
LDA	E0	(		BRA	BREAK	(	BEING
STA	1559	(		CMPL	E0	(
				BEQ	END	(	PRESSED
BREAK	LDA	E191	(	BRA	SOUND	(
	STA	1538	(
	LDA	E253	(	SOUND	LDA	1545	(
	STA	1539	(		STA	FF2C	(
	LDX	E0	(	DELAY	LDY	E0	(
	BRA	KEYLOK	(		LEAY	1,Y	(
					CMPL	1559	(
ADD	LDX	E1600	(		BNE	DELAY	(
AGAIN	LDA	E60	(		COMA		
	STA	1545	(		STA	1545	(
	LDB	E200	(		CMPL	E0	(
	STB	1558	(		BGT	KEYLOK	(
					LDB	1558	(
	LDA	,X+	(		CMPL	E0	(
	STA	1560	(		BEQ	DEC	(
	LDA	,X+	(		DECB		
	STA	1538	(		STB	1558	(
	LDA	,X+	(		BRA	KEYLOK	(
	STA	1539	(		DECA		
	BRA	KEYLOK	(	DEC	LDB	E55	(
					STB	1558	(
KEYLOK	LDA	1538	(		STA	1545	(
	LDB	1539	(		BRA	KEYLOK	(
	ANDA	E127	(
	STB	65282	(	END	RTS	:RETURN TO BASIC	

Listing 2

```

10 PCLEAR1: CLEAR100, 20000
20 CLDADM
30 FORX=1600 TO 1707
40 READA
50 POKE X, ■
60 NEXT X
70 DATA 16, 251, 254, 18, 253, 251, 19, 239, 254, 21, 254, 254, 22, 247, 127, 24,
  247, 253, 25, 253, 254, 27, 239, 223, 29, 254, 127, 31, 223, 253, 33, 254, 191,
  35, 239, 239, 38, 239, 251, 40, 254, 239, 43, 251, 223, 46, 254, 247
80 DATA 49, 239, 127, 52, 239, 253, 55, 254, 253, 59, 253, 127, 63, 253, 247, 66,
  253, 191, 71, 247, 239, 75, 253, 239, 80, 247, 223, 86, 247, 251, 91, 247, 191,
  97, 247, 254, 101, 251, 251, 109, 239, 191
90 DATA 117, 251, 191, 125, 251, 247, 132, 251, 239, 138, 223, 254, 148, 239,
  247, 155, 223, 251
100 CLS
110 PRINT@36, "          BY JOSEPH BURR"
120 PRINT@99, " TO PLAY THE SYNTHESIZER"
130 PRINT@164, "    KEYBOARD LAYOUT"
140 PRINT@195, "  1  3  4  6  7  8  0 :          Q W E R T Y U I O P @ "
150 PRINT@259, "    G-C-D-E-F-G-A-B-C-D-E"
160 PRINT@323, "    S D F  H J  L :          Z X C V B N M , . / "
170 PRINT@386, "    F-G-A-B-C-D-E-F-G-A"
180 PRINT "      [ START ] "
190 A$=INKEY$: IFA$=" " THEN EXEC20001
200 GOTO 190

```

Listing 3

```

10 CLEAR100, 20000
20 LET A=20001
30 PRINT:
40 INPUT B
50 POKE A, B
60 LET A=A+1
70 GOTO 30

```

Table 1

20001	182	255	35	138	8	183	255	35	182	255	1
20012	132	247	183	255	1	182	255	3	132	247	183
20023	255	3	134	0	183	6	23	134	191	183	6
20034	2	134	253	183	6	3	142	0	0	32	30
20045	142	6	64	134	60	183	6	9	198	200	247
20056	6	22	166	128	183	6	24	166	128	183	6
20067	2	166	128	183	6	3	32	0	182	■	2
20078	246	6	3	132	127	247	255	2	246	255	0
20089	196	127	52	4	161	224	39	12	140	0	0
20100	39	199	140	6	172	45	197	32	177	140	0
20111	0	39	52	32	0	182	6	9	183	255	44
20122	16	142	0	0	49	33	16	188	6	23	38
20133	248	67	183	6	9	129	■	46	189	246	6
20144	22	193	0	39	■	90	247	6	22	32	176
20155	74	198	55	247	6	22	183	6	9	32	165
20166	57										


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Richard Barton presents a mathematical toolkit for use with Simon's Basic

This program is written in Simon's Basic for the Commodore 64 and is a "toolkit" aid for mathematics displays — giving the Greek and other various symbols used in mathematical formulae.

To select this new alternate alphabet — which can be used interspersed with the normal upper case alphabet of the computer — the user must select "reverse graphics" mode with the **Cntrl** key **Avs On**.

The new character set occupies all the alphabetical and numerics keys of the Commodore 64's keyboard.

To deselect this mode, just press **Cntrl Avs Off** keys. After running this program, another one can be loaded and run using the new set. I think that this program would prove very useful for those of us with a mathematical "bent".

```

10 REM CHARACTER EXTENSION
   FOR MATH
20 REM SYMBOLS.
30 REM R. BARTON 1984.
40 REM REQUIRES SIMON'S BASIC
   EXTENSION.

50
60
70
80
90 REM
100 DESIGN2:$E000+129#8 REM ALPHA
110 Q.....
120 Q...BBB...
130 Q...B...B...
140 Q...B...B...
150 Q...B...B...
160 Q...B...B...
170 Q...B...B...
180 Q...B...B...
190 Q...B...B...
200 DESIGN2:$E000+130#8 REM BETA
210 Q.....
220 Q...BBB...
230 Q...B...B...
240 Q...B...B...
250 Q...B...B...
260 Q...B...B...
270 Q...B...B...
280 Q...B...B...
290 Q...B...B...
300 DESIGN2:$E000+131#8 REM GAMMA
310 Q.....
320 Q...BBB...
330 Q...B...B...
340 Q...B...B...
350 Q...B...B...
360 Q...B...B...
370 Q...B...B...
380 Q...B...B...
390 Q...B...B...
400 DESIGN2:$E000+132#8 REM DELTA
410 Q.....
420 Q...BBB...
430 Q...B...B...
440 Q...B...B...
450 Q...B...B...
460 Q...B...B...
470 Q...B...B...
480 Q...B...B...
490 Q...B...B...
500 DESIGN2:$E000+133#8
   REM EPSILON
510 Q.....
520 Q...BBB...
530 Q...B...B...
540 Q...B...B...
550 Q...B...B...
560 Q...B...B...
570 Q...B...B...
580 Q.....
590 DESIGN2:$E000+134#8 REM ZETA
600 Q...BBB...
610 Q...B...B...
620 Q...B...B...
630 Q...B...B...
640 Q...B...B...
650 Q...B...B...
660 Q...B...B...
670 Q...B...B...
680 Q...B...B...
690 Q...B...B...
700 DESIGN2:$E000+135#8 REM ETA
710 Q.....
720 Q...BBB...
730 Q...B...B...
740 Q...B...B...
750 Q...B...B...
760 Q...B...B...
770 Q...B...B...
780 Q...B...B...
790 Q...B...B...
800 DESIGN2:$E000+136#8 REM THETA
810 Q.....
820 Q...BBB...
830 Q...B...B...
840 Q...B...B...
850 Q...B...B...
860 Q...B...B...
870 Q...B...B...
880 Q...B...B...
890 Q...B...B...
900 DESIGN2:$E000+137#8 REM IOTA
910 Q.....
920 Q...BBB...
930 Q...B...B...
940 Q...B...B...
950 Q...B...B...
960 Q...B...B...
970 Q...B...B...
980 Q...B...B...
990 Q...B...B...
1000 DESIGN2:$E000+138#8 REM KAPPA
1010 Q.....
1020 Q...BBB...
1030 Q...B...B...
1040 Q...B...B...
1050 Q...B...B...
1060 Q...B...B...
1070 Q...B...B...
1080 Q...B...B...
1090 Q...B...B...
1100 DESIGN2:$E000+139#8 REM LAMBDA
1110 Q.....
1120 Q...BBB...
1130 Q...B...B...
1140 Q...B...B...
1150 Q...B...B...
1160 Q...B...B...
1170 Q...B...B...
1180 Q...B...B...
1190 Q...B...B...
1200 DESIGN2:$E000+140#8 REM MU
1210 Q.....
1220 Q...BBB...
1230 Q...B...B...
1240 Q...B...B...
1250 Q...B...B...
1260 Q...B...B...
1270 Q...B...B...
1280 Q...B...B...
1290 Q...B...B...
1300 DESIGN2:$E000+141#8 REM NU
1310 Q.....
1320 Q...BBB...
1330 Q...B...B...
1340 Q...B...B...
1350 Q...B...B...
1360 Q...B...B...
1370 Q...B...B...
1380 Q...B...B...
1390 Q...B...B...
1400 DESIGN2:$E000+141#8 REM XI
1410 Q...BBB...
1420 Q...B...B...
1430 Q...B...B...
1440 Q...B...B...
1450 Q...B...B...
1460 Q...BBB...
1470 Q...B...B...
1480 Q...B...B...
1490 Q...B...B...
1500 DESIGN2:$E000+142#8
   REM OMICRON
1510 Q.....
1520 Q...BBB...
1530 Q...B...B...
1540 Q...B...B...
1550 Q...B...B...
1560 Q...B...B...
1570 Q...B...B...
1580 Q...B...B...
1590 Q...B...B...
1600 DESIGN2:$E000+143#8 REM PI
1610 Q.....
1620 Q...BBB...
1630 Q...B...B...
1640 Q...B...B...
1650 Q...B...B...
1660 Q...B...B...
1670 Q...B...B...
1680 Q...B...B...
1690 Q...B...B...
1700 DESIGN2:$E000+144#8 REM RHO
1710 Q.....
1720 Q...BBB...
1730 Q...B...B...
1740 Q...B...B...
1750 Q...B...B...
1760 Q...B...B...
1770 Q...B...B...
1780 Q...B...B...
1790 Q...B...B...
1800 DESIGN2:$E000+145#8 REM SIGMA
1810 Q.....

```

continued over the page ▶

Commodore 64

```

1820 Q...BB..RR
1830 Q...P...R..
1840 Q..P...P..
1850 Q..B...P..
1860 Q...B...F..
1870 Q...BB...
1880 Q.....
1900 DESIGN2.$E000+146*8 REM TRI
1910 Q.....
1920 Q.....
1930 Q..BBBRR..
1940 Q...B....
1950 Q...P....
1960 Q...P....
1970 Q...B....
1980 Q.....
2000 DESIGN2.$E000+147*8 REM PnI
2010 Q...B....
2020 Q..BBBFB..
2030 QB..E...B..
2040 QB..B...B..
2050 QB..B...B..
2060 QB..E...B..
2070 Q..BBBFB..
2080 Q...F....
2100 DESIGN2.$E000+147*8 REM CHI
2110 QB.....R..
2120 Q..B...B..
2130 Q..B...B..
2140 Q...B....
2150 Q...B....
2160 Q..B...P..
2170 QB.....B..
2180 Q.....
2200 DESIGN2.$E000+149*8 REM PSI
2210 Q.....
2220 QB..B...B..
2230 QB..R...B..
2240 QB..B...B..
2250 Q..B...B..
2260 Q...BBB...
2270 Q...B....
2280 Q...B....
2300 DESIGN2.$E000+150*8
    REM OMEGA
2310 Q.....
2320 Q.....
2330 QB..B...B..
2340 QB..B...B..
2350 QB..B...B..
2360 QB..B...B..
2370 Q..BBBFB..
2380 Q.....
2400 DESIGN2.$E000+151*8
    REM INFINITY
2410 Q.....
2420 Q.....
2430 Q..BB..BB..
2440 QB..B...B..
2450 QB..B...B..
2460 QB..B...B..
2470 Q..BB..BB..
2480 Q.....
2500 DESIGN2.$E000+152*8 REM ANGLE
2510 Q.....B..
2520 Q.....B..
2530 Q.....B..
2540 Q.....B..
2550 Q...B....
2560 Q..B....

2570 QBBBRRRR..
2580 Q.....
2600 DESIGN2.$E000+152*8 REM ANGLE
2610 Q.....
2620 Q.....
2630 Q.....
2640 Q...B....
2650 Q...B...B..
2660 Q..B...B..
2670 QTBFBFBFB..
2680 Q.....
2700 DESIGN2.$E000+153*8 REM SQUARE
2710 QBBBRRRRRR..
2720 QB.....B..
2730 QB.....P..
2740 QB.....P..
2750 QB.....P..
2760 QB.....P..
2770 QBFBRRRRRR..
2780 Q.....
2800 DESIGN2.$E000+154*8 REM CIRCLE
2810 Q.....
2820 Q..BBBRR..
2830 QB.....P..
2840 QB.....B..
2850 QB.....P..
2860 QB.....P..
2870 Q..BBBRR..
2880 Q.....
2900 DESIGN2.$E000+177*8
    REM PARALLEL TO
2910 Q..B...B...
2920 Q..B...B...
2930 Q..B...B...
2940 Q..B...B...
2950 Q..B...B...
2960 Q..B...B...
2970 Q..B...B...
2980 Q..B...B...
3000 DESIGN2.$E000+179*8 REM
    FERR TO
3010 Q...B....
3020 Q...B....
3030 Q...B....
3040 Q...B....
3050 Q...B....
3060 Q...B....
3070 QBBBRRRRRR..
3080 Q.....
3100 DESIGN2.$E000+179*8 REM
    CONGR. TO
3110 Q.....
3120 Q.....
3130 QBBBRRRRRR..
3140 Q.....
3150 QBBBRRRRRR..
3160 Q.....
3170 QBBBRRRRRR..
3180 Q.....
3200 DESIGN2.$E000+180*8 REM
    SIMILAR TO
3210 Q.....
3220 Q.....
3230 Q.....
3240 Q..B....
3250 QB..B...B..
3260 Q.....BB..
3270 Q.....
3280 Q.....

3300 DESIGN2.$E000+181*8 REM
    EMPTY SET
3310 Q.....P..
3320 Q..BBBRR..
3330 QB...B...B..
3340 QB..B...B..
3350 QB..B...B..
3360 Q..BFBRR..
3370 QB.....
3380 Q.....
3400 DESIGN2.$E000+182*8
    REM I TO 1
3410 Q.....
3420 Q...B...B..
3430 Q..B...B..
3440 QBBBRRRRRR..
3450 Q..B...B..
3460 Q...B...B..
3470 Q.....
3480 Q.....
3500 DESIGN2.$E000+183*8 REM C
3510 Q.....P..
3520 Q.....P..
3530 QBBBRRRRRR..
3540 Q...B....
3550 QBBBRRRRRR..
3560 Q..B....
3570 Q..B....
3580 Q.....
3600 DESIGN2.$E000+184*8
    REM APPROX =
3610 Q.....
3620 Q..BB....
3630 QB..BB..B..
3640 Q.....BB..
3650 Q..BB....
3660 QB..BB..B..
3670 Q.....BB..
3680 Q.....
3700 DESIGN2.$E000+185*8 REM
    PROP. TO
3710 Q.....
3720 Q.....
3730 Q..BBB..BBB..
3740 QB...B...
3750 QB...P...
3760 QB...B...
3770 Q..BBB..BBB..
3780 Q.....
3800 DESIGN2.$E000+176*8 REM
    APPROACHES
3810 Q.....
3820 Q.....B..
3830 Q.....B..
3840 QBBBRRRRRR..
3850 Q.....B..
3860 Q.....B..
3870 Q.....
3880 Q.....

```

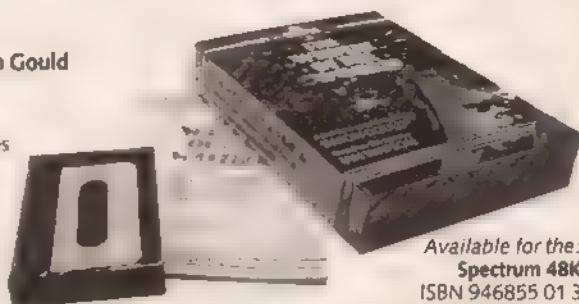
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Colour spectrum

R Watson shows how to design kaleidoscopic patterns on the BBC B

This program for the BBC model B allows you to design your own Kaleidoscopic patterns by creating two images with a maximum of five co-ordinates to each. These images are repeated a num-

ber of times specified by you.

The most interesting designs are produced by using the maximum number of points, with a step size between 10 - 20.

It is not too difficult to convert this

program for other computers. Replace *Repeat nnn Until* with *If Not n Then Go To*. Replace procedures by subroutines and change line 620 and 630 to the statements to change Paper and Ink colour on your computer.

```

10 REM 1984 R.WATSON
20 ON ERROR GOTO 110
30 DIM X%(4,3,5),Y%(4,3,5),XX(5),YY(5)
40 MODE 7
50 PRINTCHR$(141):CHR$(132):CHR$(157):
  CHR$(135):" SYMMETRICAL DESIGN"
60 PRINTCHR$(141):CHR$(132):CHR$(157):CHR$(
  135):" SYMMETRICAL DESIGN"
70 PRINT"CHR$(131):" This program allows
  you to draw a""CHR$(131):" design,
  this is then given a mirror""
  CHR$(131):" image treatment."
80 PRINT"CHR$(131):" Instructions are
  given in the program."
90 PRINT"TAB(4)CHR$(129):" PRESS
  ANY KEY TO CONTINUE"
100 REPEAT UNTIL GET
110 MODE 2:VDU 19:8000:0:0:0:0:
120 COLOUR 3
130 PRINT"TAB(4)"CHOOSE COLOURS""
140 :
150 FOR CX=1 TO 7
160 READ N%
170 COLOUR 3:PRINTTAB(4):CX:" : "
180 COLOUR CX:PRINT N%
190 NEXT
200 :
210 REPEAT
220 COLOUR 3:PRINTTAB(2,14):"
  BACKGROUND (1-7)"
230 B%=GET%
240 UNTIL FN_KEY("1234567",B%)
250 :
260 PRINT"
270 REPEAT
280 COLOUR 5:PRINTTAB(2,15):
  "FOREGROUND (1-7)"
290 F%=GET%
300 UNTIL FN_KEY("1234567",F%)
310 :
320 CLS:COLOUR 3:PRINTTAB(0)"NUMBER OF
  POINTS""TAB(4)"MAXIMUM OF 5"
330 REPEAT
340 F%=GET%
350 UNTIL FN_KEY("12345",F%)
360 :
370 COLOUR 1
380 PRINT"TAB(3)" ENTER X AND Y""
  TAB(3)" COORDINATES"
390 COLOUR 3:PRINT"" WITH X MAXIMUM
  1280"
400 PRINT" WITH Y MAXIMUM 1024"
410 FOR IX=1 TO 3:COLOUR 5:PRINT" FOR
  IMAGE ":"IX":FOR NX=1 TO VAL(P%)
420 PRINTTAB(4)" POINT ":"NX"
430 INPUT TAB(5)"X IS ":"Y%(1,IX,NX)
440 INPUT TAB(6)"Y IS ":"Y%(1,IX,NX)
450 PRINT"
460 SP=0
470 PROC_SETXY
480 NEXT:NEXT
490 NX=NX-1:CLS:COLOUR 4:PRINT "HOW
  MANY STEPS":INPUT ":" P%:CLS
500 :
510 REPEAT
520 FOR IX=1 TO 3:FOR FX=0 TO IX-1:
  SP=SP+1:RX:NEXT FX
530 FOR DX=1 TO 4
540 FOR JX=1 TO NX
550 XX(JX)=X%(DX,1,JX)+(SP*(X%(DX,2,
  JX)-X%(DX,1,JX))):YY(JX)=Y%(DX,1,J
  X)+(SP*(Y%(DX,2,JX)-Y%(DX,1,JX)))
560 IF JX=2 PROC_PLOT
570 NEXT:NEXT:SP=0:NEXT
580 FOR HX=1 TO 5000:NEXT:CLS:UNTIL0
590 END
600 :
610 DEF PROC_PLOT
620 VDU 19,128,128+VAL(B%):0:
630 GCOL 0,VAL(F%)
640 IF IX=1 MOVEXX(DX,1,1),Y%(DX,1,1):
  DRAW XX(DX,1,2),Y%(DX,1,2)
650 MOVEXX(JX-1),YY(JX-1):DRAW XX
  (JX),YY(JX)
660 ENDPROC
670 :
680 DEF FN_KEY(SS$,FF%)
690 =INSTR(SS$,FF%)
700 :
710 DEF PROC_SETXY
720 X%(2,IX,NX)=1280-XX(1,IX,NX)
730 Y%(2,IX,NX)=YX(1,IX,NX):X%(3,IX,NX)
  =X%(1,IX,NX):YX(3,IX,NX)=1024-
  YX(1,IX,NX)
740 X%(4,IX,NX)=1280-X%(1,IX,NX)
750 Y%(4,IX,NX)=1024-YX(1,IX,NX)
760 ENDPROC
770 :
780 DATA RED, GREEN, YELLOW, BLUE, MAGENTA
  , CYAN, WHITE

```

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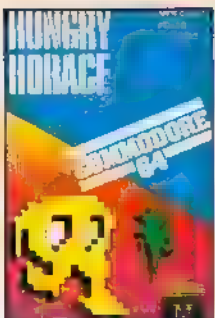
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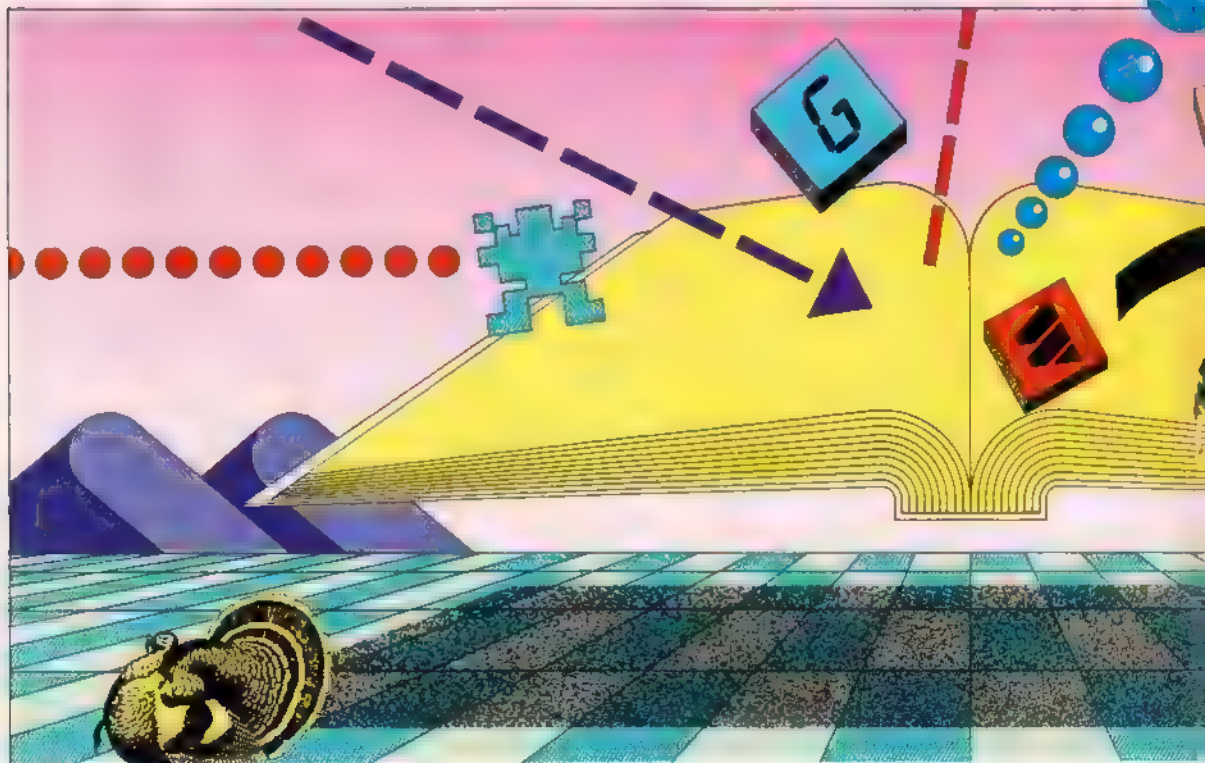
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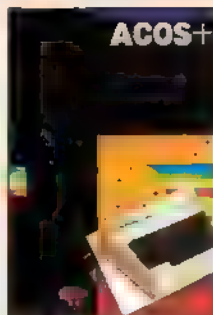
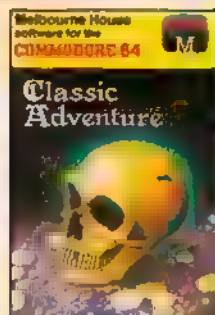


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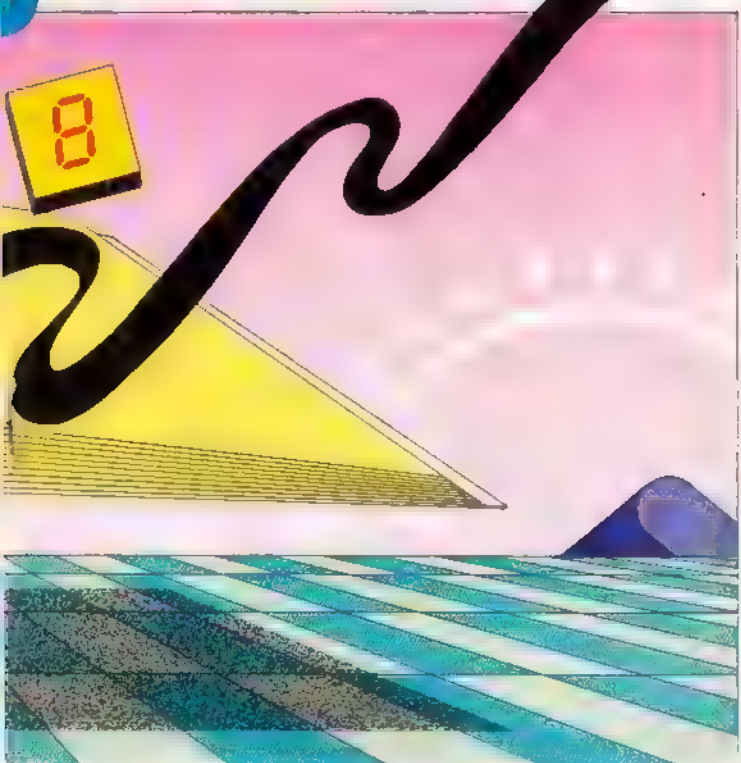
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— Popular Computing Weekly

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All versions of 'The Hobbit' are identical with regard to the adventure program. Due to memory limitations BBC cassette version does not include graphics.

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Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Quack Attack

on Spectrum

You have to shoot down the ducks before they land and eat your crops. Sounds easy, but the duck is fast and will keep moving

when you fire. This game features 3 speeds and animated graphics to make the duck flap its wings. Instructions are contained in the program.

Program

4 Go to graphics and instructions
5-50 Sets up screen

100-290 Main loop
300-490 Second loop for fire routine
500-525 Kill duck
900-950 Duck lands
1000-1030 Graphics data
2000-2040 Instructions
2050-2080 Set speed

Variables

sc Score
a,b Duck co-ordinates
x,y Bullet co-ordinates
t Used for delay loop
h Sets length of delay loop

```

1 REM      QUACK ATTACK
2 REM      © 1984 G. SMITH
3 REM
4 GO TO 1000
5 BORDER 3: PAPER 0: BRIGHT 1
INK 7: CLS
6 LET sc=0
10 LET a=2
15 FOR b=30 TO 1 STEP -1
20 FOR x=20 TO 1 STEP -1
35 LET y=15
50 PRINT INK 4; AT 21,0; "
60 PRINT INK 0; PAPER 7: BRIGHT 0; AT 0,0; "
70 PRINT INK 0; "SCORE="; sc
80 LET b=b-1
105 PRINT INK 2; AT a,b; "4-"; IF
b<29 THEN PRINT AT a,b+2; " "
105 PRINT INK 7; AT 20,15; "A"
110 IF INKEY$="M" THEN GO TO 300
115 FOR f=1 TO h: NEXT f
120 LET b=b-1
125 PRINT INK 2; AT a,b; "4-"; AT
a,b+2; " "
127 IF a=20 AND b=15 THEN GO TO 900
130 IF b<1 THEN LET b=30: PRINT
AT a,0; " " LET a=a+2
140 PRINT INK 7; AT 20,15; "A"
150 IF a=20 AND b=15 THEN GO TO 900
200 FOR f=1 TO h: NEXT f
290 GO TO 100
300 PRINT INK 6; AT x,y; "b"
305 IF x<19 THEN PRINT AT x+1,y
" "
310 PRINT INK 7; AT 20,15; "A"
350 LET x=x-1
355 LET b=b-1
360 PRINT INK 2; AT a,b; "4-"; AT
a,b+2; " "
365 IF x=1 THEN LET x=20: PRINT
AT 2,15; " " GO TO 100
370 FOR f=1 TO h-1: NEXT f
375 IF b<1 THEN LET b=30: PRINT
AT a,0; " " LET a=a+2
400 LET b=b-1
410 PRINT INK 2; AT a,b; "4-"; AT
a,b+2; " "
415 IF b<1 THEN LET b=30: LET a
=a+2
417 IF a=20 AND b=15 THEN GO TO 900
420 FOR f=1 TO h-1: NEXT f
450 IF x=a AND y=b THEN GO TO 500
455 IF x=a AND y=b+1 THEN GO TO 500
490 GO TO 300
500 PRINT AT x,y; " "; AT x+1,y; "
505 PRINT INK 4; AT a,b; "4-"; BE
EP .5,5
510 PRINT INK 6; AT a,b; "4-"; BE
EP .5,5
515 PRINT AT a,b; " "
520 LET sc=sc+5
525 GO TO 10
900 BORDER 6: BEEP .3,5: BORDER
5: BEEP .3,4: BORDER 4: BEEP .3
2: BEEP .3,2: BEEP .3,0: BORDER
1: BEEP .3,1: BORDER 0: BEEP .3
,-3
910 PAPER 0: CLS
920 PRINT INK 7; AT 0,10; "TOUGH
LUCK"; AT 3,5; "A DUCK HAS LANDED
AND "; AT 5,5; "HAS EATEN YOUR CRO
PS "
930 PRINT INK 7; AT 9,8; "YOU SCO
RED- "; sc
940 PRINT INK 7; AT 18,2; "PRESS
ANY KEY TO PLAY AGAIN"
950 PAUSE 0: PAUSE 0: GO TO 200
0
1000 FOR n=0 TO 47
1010 READ a: POKE USR "a"+n,a
1020 DATA 0,16,51,255,3,1,0,0,0,
0,224,255,102,224,224,32,0,17,51
,255,7,0,0,0,112,224,102,255,240
,0,0,0,12,12,28,44,60,252,236,19
2,4,4,14,14,14,14,0
1030 NEXT n
2000 BORDER 0: PAPER 1: INK 7: C
LS
2010 PRINT INVERSE 1: BRIGHT 0; AT
0,0; "QUACK ATTACK © 1984 G.
SMITH"
2020 PRINT AT 2,1; "THE DUCKS ARE
CIRCLING ABOVE YOUR FIELD AN
D YOU MUST SHOOT THEM DOWN BEF
ORE LAND AND EAT YOUR CROPS. I
F THEY DO THE GAME IS OVER. U
SE THE "M
" KEY TO FIRE"
2030 PRINT AT 10,1; "CHOOSE DIFFI
CULTY"
2040 PRINT AT 12,1; "1-SLOW
2-MED.
3-FAST"
2050 INPUT INKEY$
2055 IF INKEY$="1" THEN LET h=25
: GO TO 5
2060 IF INKEY$="2" THEN LET h=16
: GO TO 5
2065 IF INKEY$="3" THEN LET h=8:
GO TO 5
2080 IF INKEY$<>"1" AND INKEY$<>
"2" AND INKEY$<>"3" THEN GO TO 2
010

```

I = AB
 4 = CD
 1 = E
 1 = F

Quack Attack
by Gordon Smith

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You may already have a game up your sleeve. Or this may be the stimulus to get cracking on that masterpiece you always knew you could write. Either way, we must receive your submission by July 30th.

What you should send

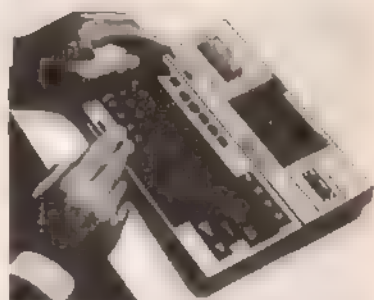
Send us the program listing, written in BASIC (not machine code), preferably on a cassette.

Include a short synopsis of the object of the game or puzzle, a brief description of what should happen when the program is run and an indication of the level of difficulty.

All entries will be acknowledged, and must be received by July 30th. Those entries included in the books will carry the names of the authors and remain their copyright.

Please send your entry to:

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8 Forge Court, Reading Road, Yateley
Camberley, Surrey GU17 7RX.



These two books will be published
by Times Books and Sidgwick & Jackson
on 31st October 1984.

Open Forum

Fractions

on ZX81

This is based on what I learnt at school some 50 years ago, and uses techniques not now in fashion, but it does force the

computer to work in fractions, gives the right answers, and shows the 'working out' for each of the operators +, -, and *.

The first Screen asks for an operator, and when this has been entered, the next Screen enables the sum to be entered, with

facilities to correct any mistakes. The following Screen, depending upon the operator chosen, then shows the stages involved in working out the sum, with the appropriate figures, and the answer on the bottom line.

```

1 REM "FRACTIONS"
2 REM U.A.6000E.23-10-01.I35
3
4 DIM A(6)
5 PRINT AT 1,8;"*****"
6
7 PRINT AT 2,8;"* FRACTIONS *
8
9 PRINT AT 3,8;"*****"
10
11 PRINT AT 5,5;"IS YOUR SUM T
12
13 PRINT AT 7,5;" ADDITION
14 (+)
15
16 PRINT AT 9,5;" SUBTRACTION
17 (-)
18
19 PRINT AT 11,5;" MULTIPLICAT
20
21 PRINT AT 13,5;" DIVISION
22 (/)
23
24 PRINT AT 15,5;"TYPE A SIGN
25
26 OR "/"
27
28 INPUT A$
29
30 CLS
31
32 IF NOT (A$="+" OR A$="-" OR
33 A$="*" OR A$="/") THEN GOTO 40
34
35 PRINT AT 1,0;"TYPE IN YOUR
36 SUM IN THIS FORM"
37
38 PRINT AT 3,2;"A AND B/C "A
39
40 D AND E/F
41
42 PRINT AT 5,1;"IF THERE ARE
43 NO WHOLE NUMBERS"
44
45 PRINT AT 6,1;"FOR""A""OR""D
46 THEN TYPE ""0.""
47
48 FOR N=1 TO 6
49 PRINT AT N+7,1;"TYPE NUMBER
50 FOR ""CHR$(N+37)"" = ""
51
52 INPUT A(N)
53 PRINT A(N)
54 NEXT N
55
56 PRINT AT 15,1;"A(1) " AND "
57
58 A(2) " "A(3) " "A(4) "
59 AND "A(5) " "A(6)
60
61 PRINT AT 17,1;"IS THAT RIGH
62
63 TYPE""Y"" OR ""N""
64
65 INPUT B$
66 CLS
67
68 IF NOT (B$="Y" OR B$="N") T
69
70 GOTO 200
71
72 IF B$="N" THEN GOTO 120
73
74 LET A=A(1)
75 LET B=B(1)
76 LET C=A(2)
77 LET D=B(2)
78 LET E=A(3)
79 LET F=B(3)
80 LET G=A(4)
81 LET H=B(4)
82 LET I=A(5)
83 LET J=B(5)
84 LET K=A(6)
85 LET L=B(6)
86 LET M=1
87 LET N=0
88
89 PRINT AT 1,3;"A " AND "B "/"
90
91 C " "A " "D " AND "E "/"F
92
93 IF A$="+" THEN GOTO 400
94
95 PRINT AT 2,1;"CHANGE TO UUL
96
97 FRACTIONS"
98
99 LET P=A+C*B
100 LET Q=D+E*B
101
102 PRINT AT 3,3;"P ""C ""A$
103
104 Q ""F
105
106 IF A$="+" THEN GOTO 600
107
108 IF A$="-" THEN GOTO 500
109
110 PRINT AT 5,1;"FIND LOWEST C
111
112 COMMON DENOMINATOR"
113
114 LET K=C
115 LET J=F
116
117 GOSUB 1150
118 SLOW
119
120 LET X=C/F/N
121
122 PRINT AT 6,1;"L.C.D.OF ""C;
123
124 AND ""F "" = ""X
125
126 PRINT AT 7,1;"H.C.F. = ""N
127
128 IF A$="+" THEN GOTO 472
129
130 LET P=X/C*P
131 LET Q=X/F*Q
132
133 PRINT AT 8,3;"P ""X ""A$
134
135 Q ""X
136
137 GOTO 500
138
139 LET B=X/C*B
140
141 LET E=X/F+E

```

```

142 PRINT AT 8,3;"A " AND "B "/"
143
144 X " "A " "D " AND "E "/"F
145
146 GOTO 540
147
148 PRINT AT 10,1;"SUBTRACT TOP
149
150 ROU"
151
152 LET U=P-Q
153
154 LET V=0
155
156 PRINT AT 11,3;"U ""X
157
158 IF U<0 THEN LET R=-1
159
160 GOTO 730
161
162 PRINT AT 10,1;"ADD WHOLE NU
163
164 MBERS: ADD TOP ROU"
165
166 LET U=B+C
167
168 LET V=A+D
169
170 PRINT AT 11,3;"U " AND "V;"
171
172 X
173
174 GOTO 730
175
176 PRINT AT 9,1;"MULTIPLY TOP
177
178 ROU"
179
180 PRINT AT 10,1;"MULTIPLY BOT
181
182 TOM ROU"
183
184 IF A$="/" THEN GOTO 560
185
186 LET V=P*B
187
188 LET X=C*F
189
190 GOTO 520
191
192 LET U=P*F
193
194 LET X=Q*C
195
196 GOTO 520
197
198 PRINT AT 5,1;"CHANGE SIGN T
199
200 O MULTIPLY (S)
201
202 PRINT AT 6,1;"INVERT ONE FR
203
204 ACTION"
205
206 PRINT AT 7,3;"P ""C "" + ""
207
208 F ""X ""
209
210 GOTO 590
211
212 IF ABS (U) < X THEN GOTO 630
213
214 LET U=ABS (U)
215
216 PRINT AT 13,1;"DIVIDE TOP B
217
218 Y BOTTOM"
219
220 LET U=INT (U/X)
221
222 LET V=U-U*X
223
224 IF A$="+" THEN GOTO 810
225
226 LET U=U
227
228 IF U=0 THEN GOTO 905
229
230 IF U<0 THEN LET U=U+U
231
232 IF U=0 THEN LET U=ABS (U)
233
234 PRINT AT 14,3;"U " AND "V;"
235
236 X
237
238 GOTO 830
239
240 LET U=U+U
241
242 GOTO 785
243
244 PRINT AT 15,1;"WILL FRACTIO
245
246 N DIVIDE OUT ?"
247
248 LET K=ABS (U)
249
250 LET J=ABS (X)
251
252 GOSUB 1150
253 SLOW
254
255 IF N=1 THEN GOTO 920
256
257 PRINT AT 17,1;"YES DIVIDE B
258
259 Y ""N
260
261 LET U=U/N
262
263 LET X=X/N
264
265 PRINT AT 19,1;"ANSWER = ""U
266
267 AND ""V ""X
268
269 GOTO 940
270
271 PRINT AT 19,1;"ANSWER = ""U
272
273 GOTO 940
274
275 PRINT AT 17,1;"NO....."
276
277 LET U=U+R
278
279 GOTO 900
280
281 PRINT AT 21,1;"TYPE""NEULIN
282
283 TO RUN AGAIN"
284
285 CLS
286
287 INPUT C$
288
289 IF NOT C$="" THEN GOTO 940
290
291 GOTO 5
292
293 FAST
294
295 IF K<J THEN GOTO 1190
296
297 LET K=K-J
298
299 IF J<K THEN GOTO 1160
300
301 LET J=J-K
302
303 IF J=0 THEN GOTO 1240
304
305 IF K=0 THEN GOTO 1260
306
307 GOTO 1190
308
309 LET N=K
310
311 RETURN
312
313 LET N=J
314
315 RETURN
316
317 SAVE "FRACTIONS"
318
319 RUN

```

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Open Forum

Cobra

on Spectrum

This is a sophisticated version of the old snake game. You must stay alive by not hitting edges. Eat the purple and green creatures — red creatures can only be eaten when energy is high.

Type in program 1 and when prompted even the data from list two. Save by typing **Goto 9996**. Outer edge keys are for movement, inner keys act as pause.

```

1 REM JEFF+EDDIE DUNCAN-DUNLOP
2 LET LE=5: BORDER 6: PAPER 7: INK 9: CLS
3 LET H=0: LET W=0
5 GO SUB 1000
10 DIM V(22,33)
20 DIM A(22,33)
25 LET A=0: LET B=CHR$ 16+CHR$ 16+CHR$ 145:
   LET C=CHR$ 16+CHR$ 4+CHR$ 146:
   LET D=CHR$ 16+CHR$ 3+CHR$ 147
29 LET LE=0: LET H=4
70 LET W=35: LET V=10
71 LET B=2: LET W=V
72 LET C(100) LET V(100)
73 CLS
74 LET J=0
75 LET F=5
80 RESTORE
40 INK 9
41 LET J=1 TO
42 PRINT "PAPER PRINT NAME"
43 PRINT "PAPER PRINT 21,0"
44 LET J=0 TO 11: PRINT AT N,0: " " NEXT N
100 FOR I=1 TO J
110 LET D=AND(14+31: LET W=AND(27+2
120 BE INT D=10 THEN GO TO 150
130 IF CODE SCREEN(0,W) 32 THEN BEEP
140 J=1: GO TO 150
170 PRINT "IN 31AT 0,W,155
180 NEXT J
190 LET E=0
200 LET D1=5
210 LET D2=0
220 PRINT AT 0,21: "SCORE 1AT 0,815:"
230 PRINT AT 21,31: "HI SCORE 1H
231 LET LE=LE+1: PRINT AT 21,20: "LEVEL 111
240 PRINT AT 0,15: "STRENGTH 12
300 LET V(Y,X)=V1
310 LET O(Y,X)=X1
320 LET X=X+X1
330 LET Y=Y+Y1
331 IF X<1 OR X>31 OR Y<1 OR Y>20 THEN GO TO 3000
332 LET AT=AT+1 (V,X1)
340 IF AT=16 THEN GO TO 400
350 IF AT=57 THEN GO TO 3000
360 IF AT=58 AND E=0 THEN GO TO 3000
365 LET D=5
370 IF AT=59 THEN GO TO 2000
380 IF AT=58 THEN GO TO 2200
390 IF AT=60 THEN GO TO 2300
395 IF A=+0370 THEN GO TO 4000
400 PRINT INK 11AT V,X1A6
401 LET D=D+10
420 IF D=6 THEN GO TO 500
430 LET C=V(A,B)
440 LET B=+0(A,B)
450 LET A=A+C
460 PRINT AT A,B: "
470 OUT 254,254
500 LET K=IN 254
507 IF K=255 THEN PAUSE 1: PAUSE 0
508 IF K=253 OR K=254 THEN GO TO 511
510 GO TO 300
511 BEEP 102,0: LET D1=D1+(K=254) D1=253
520 IF D1=3 THEN LET D1=0
530 IF D1=0 THEN LET D1=3
540 LET K1=V1 LET Y1=0
550 LET X1=X1+(D1=2)-(D1=0)
560 LET Y1=Y1+(D1=3)-(D1=1)
570 GO TO 300

```

Microradio

GW6JJN



Hackers paradise

More mail queries this week. Since Microradio is also a forum for questions and ideas relevant to the world of radio computing, I welcome any letters or listings, hints and tips, etc. even funny experiences. I had one letter from a man who shall be nameless asking how one might interface and obtain software for a ZX81 in order to receive and decode signals from unidentified flying objects. I can say in all honesty that I do not know of a source for such, unless you see a small ad hovering one dark night...

Trevor Singstall writes from

Zwolle in The Netherlands asking how he might implement RTTY on a BBC B computer for use on CB. I should point out at this juncture that the law regarding citizens band radio in Britain forbids the use of any mode other than plain voice communications, so you are unlikely to find RTTY on this section of the radio spectrum in this country. I mention this because Trevor specifically wanted to communicate with British radio users. The best thing to do is to get an amateur radio licence particularly as many British amateurs communicate regularly with Dutch stations on both shortwave and VHF. RTTY systems for the BBC computer can be obtained from S.P. Electronics, 48 Linby Road, Hucknall, Nottinghamshire.

Trevor also asks what RTTY can do for a computer user. The answer is simple — can open up the world. With a

computer, an RTTY system and a radio, the computer user is in a position to understand all those strange RTTY noises that can be heard as you tune through the short wave frequencies. Weather stations, ships, news services, satellites and a whole host of others use this form of communication in addition to radio amateurs. RTTY on a home computer is one of the most exciting things that can be done. I've never seen any arcade game that is as addictive as sitting watching all those strange and exotic messages appearing on the screen. Don't worry about hearing something you shouldn't, since all sensitive messages are scrambled — well, almost all. Radio Teletype is what the Americans call 'hackers paradise'; very habit forming.

Finally this week, a letter from Bruce Worn of Edinburgh who asks about attaching the Spectrum to the radio in order to decode morse. He asks what

kind of interface is required and where to get the software. I think that the best advice in this situation is to point you in the direction of the Sinclair Amateur Radio Users Group (SARUG) who answered this question in a recent newsletter that they published. On the subject of SARUG, their latest newsletter includes information about preventing computer radio interference and drawing maps on the Spectrum. SARUG is a non-profit making organisation so please send a stamped addressed envelope when contacting them. They can be reached at SARUG, 3 Red House Lane, Leiston, Suffolk, IP16 4JZ.

Ray Berry GW6 JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

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addictive

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This is a very impressive product of benefit to any Spectrum programmer. David Bolton ZX COMPUTING Aug Sept 1983

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DEVPAC is most highly recommended. The documentation is first class. Your Computer May 1983

If you write programs in machine code, buy DEVPAC - it is the best currently on the market. Adam Denning, ZX SOFT in Which Micro September 1983

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Mike and Peter Gerrard are regular contributors to Which Micro? and Personal Computer News. Peter Gerrard is the author of many titles in the Duckworth Home Computing list, including the Exploring Adventures series, and contributes to Popular Computing Weekly, Commodore Horizons and Micro Adventure.



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Tony Bridge's Adventure Corner



Wheel of fortune

Epic Software are situated in Melton Mowbray, Leicester, and have informed me of their new release for the BBC and Electron, *Wheel of Fortune*. This takes its place alongside three other adventures from Epic—all for the Acorn machines—*Castle Frankenstein*, *Quest for the Holy Grail* and *The Kingdom of Klein*. Although the others have had rather good reviews (judging by the selected quotes in Epic's catalogue—well, you wouldn't expect them to print bad reviews, would you?), and would appear to have gathered quite a loyal following among Acorn adventure fans, I haven't seen them, so cannot comment.

The present adventure, however, I have seen. It is a graphic/text adventure (although Electron owners, unfortunately, will not have the pleasure of pictures), and has over 250 locations. The game is written in machine code and is extremely fast, with the graphics (when you have them!) being drawn almost instantaneously, although the *Groff* command can be used to switch them off. Couple this speed with the sophisticated language interpreter, which allows the player to type in commands of up to 254 characters, and you have a very quick game.

On top of this is a (I believe) unique feature in which the player may assign, from within the game, a commonly-used which may then be used any time that sentence is required.

Other characters in the adventure have an independent life, just like the more sophisticated Inform programs, and will carry on doing their own thing while you are doing yours... you will occasionally be told of what other characters are doing, even though they may not be at your present location.

The program is generally quite well presented, although, during loading, you should stop the tape, but the screen display neglected to tell me this fact. The titles are rather nice, though not stunning, and, as we've seen, the speed of the thing is impressive—and graphics on or off didn't seem to make any difference to this speed.

Epic's covering letter took a swipe at me for "continually plugging the same products over and over again... whilst completely ignoring the smaller companies who are trying to introduce new imaginative ideas into their products. Whilst we would not argue that Level 9 provide interesting adventures... the programming is approx a year behind the times with no graphics, no colour, no moving characters, no multi-statement commands, no artificial intelligence techniques, no game variations and no use made of the BBC's advanced facilities. We cannot understand why you are continually telling everybody how brilliant Level 9 are. No doubt when their next adventure is released, it will be the best thing since sliced bread, with no mention being made of the boring old black and white, text-only format."

When Level 9's new adventure is released, I'm sure it will be of the same high standard as the rest of their catalogue, and I and several thousand other satisfied adventurers are waiting for it with bated breath! And in my opinion, the "boring old black and white, text-only format" is perfectly adequate, given the excellent scene-setting descriptions of Level 9. Graphics are only of interest when they add something to the adventure, and those in *Wheel of Fortune*, by Epic's own admission, are Mode 7, and really are pretty nondescript.

Many of the puzzles are quite complex, but I find the location descriptions rather shallow and, unlike some adventures, the player is given no nudge in the right direction. For instance, the program often says "You can't do that", when the player lacks a certain vital piece of equipment. Other adventures manage to give subtle clues—"You cannot do that without the screwdriver" for example.

But what do the people at Level 9 (which is still one of those "small companies") play on their Bees? Would it surprise you, Epic, to know that they rate your adventures the best available for the BBC? Sue Gazzard, author of the best-selling *Lords of Time* rates *The Wheel of Fortune* as her favourite adventure—after the other Level 9s, of course—but insists that the graphics have nothing to do with this opinion. She finds, as I do, that the location descriptions are rather spare (the "250 locations" consist, too often, of the "You are on a road Exits North and South" variety), although many of the puzzles are very amusing and difficult.

So, at £9.95, I can recommend *The Wheel of Fortune* as a welcome addition to the rather small range of BBC adventures—but please, Epic, let's not condemn the boring text-only adventure out of hand: Epic Software, 11 Edendale Road, Melton Mowbray, Leics LE13 0EW.

Dollarsoft is a small company operating from Sheffield, and they sent me a copy of

their new adventure *Suicide Island*, which is a two-part (96K) text and graphic adventure (graphics in the second part only) available for the Spectrum and BBC/ Electron. After the program loads, during which time a very artistic title page keeps the viewer amused, the program just sits looking blank, until a key is touched, when the adventure proper starts. Pretty obvious, I know, but why don't they tell you? This is a common failing with programs of this kind—documentation must, nowadays, be comprehensive.

The game, once started, is awfully dull. Words like Help aren't recognised—worse still, the computer doesn't tell you that it won't recognise the word. It sits still for a moment, and then the cursor reappears waiting for the next command! In a moment of weakness, I typed in some well-known purple language, and that was recognised! right!

All this comes under the heading of "User Friendliness. Lack of", and *Suicide Island* has plenty of this—after a while, I just couldn't be bothered. I didn't even have to switch off the Spectrum, as even accidentally touching the Break key causes the program to New (other unrecognised words are Stop, Quit and End).

However, while looking at the program, I suddenly realised that I had seen a similar package recently. Sure enough, looking back through the files revealed *Village of Death*, from Specsoft, which seems to be situated in the next street to Dollarsoft. This program is also in two parts, this time the first part being very lengthy instructions. In fact, it is actually a scene-setter, with lots of rather painful jokes from an eyebrow-wiggling Groucho character, and Clive Sinclair as well as some newspaper cuttings.

This one is far superior to its neighbour's offering. Each time a new location is visited (but not on subsequent arrivals), the screen "wipes" like a film effect, to reveal the description. These descriptions are sometimes very well written, and the adventure looks as if it will be quite rewarding when I get some more practice on it: Specsoft, 57 Everard Avenue, Bradway, Sheffield S17 4LY. Dollarsoft, 3 Everard Glade, Bradway, Sheffield S17 4NG.

Next week, a look at two exciting and long-awaited new Adventures.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to: Tony Bridge, Adventure Corner, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



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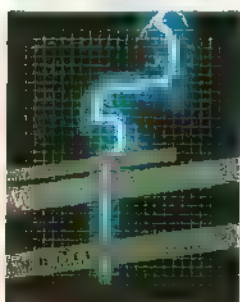
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program smoothly scrolls the landscape, the second animates the other characters. This is undoubtedly one of **White Lightning's** most powerful features.

MARKETING AND PORTABILITY Although **White Lightning** uses an integer FORTH as its host language, programs can be written in a combination of BASIC, FORTH, IDEAL and most machine languages. What's more, programs written in FORTH/IDEAL will be highly portable between the Spectrum and implementations under development for other popular micros. When it comes to marketing your completed games, there's no problem either. In fact Oasis themselves will offer to market outstanding software.

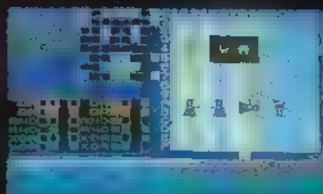
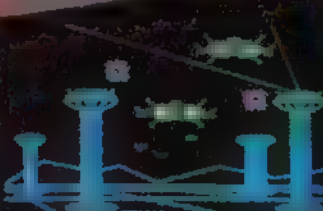
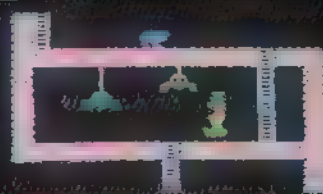
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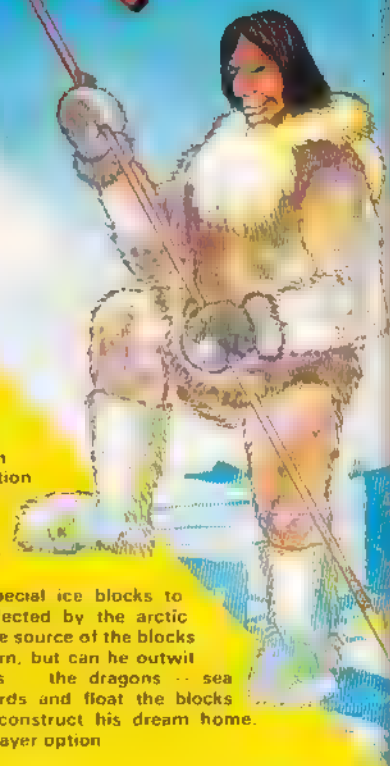
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PROGRAM BREAKER

D. Horn of Newcastle-upon-Tyne, writes:

Q I am writing to ask you if you know to stop people from breaking into my programs, but so that I can still get into them. I would like to know because I like writing adventures and otherwise it is very simple to break into a program and see how to do it.

A Without knowing what your machine is I cannot give you any advice on how to make your programs unbreakable. However, a technique I have used on the Spectrum is to *Poke* the ERR SP system variable with zero. This means that any attempt to use the *Break* key, or any error message will result in a system reset and a lost program.

To enable me to break in I used a coded message (let me in — in fact) and when the program detected this sequence of keys I reset ERR SP to the value it held before I zeroised it. This then allowed me to break into my program. I hope this has been some use to you, it may at least have given you an idea of what to do.

CHESS CRASH

Steve Perkin of Meersbrook, Sheffield, writes:

Q I recently bought the program *Dragonchess* for my Dragon 32. When I was playing a game on level 5 (up to 20 minutes) I needed a rest so wrote down the game so far. The next day when I set up the game and set the program thinking — it crashed.

After switching off and back on again the screen was filled with characters. It cost £30 to have the computer repaired, but naturally I didn't think the software could have done it. So I set up the game again. The result was exactly the same and the computer is once more unusable. It seems to me that the software must be causing the problem. Any suggestions as to where I go from here would be much appreciated.

A I agree with your first thoughts. I cannot see how the software could be causing the problem. It sounds to me that you are either suffering from defective ROM (in that the machine is not starting up properly), or from a defective power supply (which could cause instructions in the ROM to be misinterpreted). My advice to you would be to take your computer back to the firm that repaired it and tell them that you still have the original fault. If they refuse to believe you, then you could try consulting Dragon Data or even your local Trading Standards Officer, as you may have a case for getting the work done again — free.

A VAIN ATTEMPT

G. Pickles of Brieffield, Nelson, Lancs, writes:

Q I own a Commodore Vic 20. I am very happy with it, but alas I seem to be banging my head against a brick wall in my vain attempt to define my own graphics. Sounds silly doesn't it? I can *Print* characters easily enough. I can *Poke* the ASCII character set with ease but when it comes to doing the latter with my own characters I am at a loss. There are plenty of references to this User Defined character set, but nowhere does it tell you how to use it.

A If you have a Vic more than 3K of memory then you will need to relocate the screen before defining your UDG. This is done by: *Poke* 648,30: *Poke* 642,32: *Poke* 36869,240: *Poke* 36866,150: *Poke* 0,108: *Poke* 1,0: *Poke* 2,192: SYS(0)

This relocates the screen from 4096 to 7680 thus leaving locations 4096 to 7696 free for defining your own character set. Now to define your own character set you: *Poke* 52,28: *Poke* 56,28: CLR For i = 7168 TO 7679: *Poke* i, Peek(i + 25600): Next i *Poke* 36869,255. This moves the existing character set. The statements below will convert the exclamation mark symbol into your 'face' graphic.

10 For i = 7432 TO 7439: Read b: *Poke* i,b: Next i
20 Data 0,0,16,56,16,16,0,0

BATTERY POWER

James Southgate of Colchester, Essex, writes:

Q I would like to run my 48K Spectrum on a battery, other than a car battery. Is there any simple way of achieving this?

A I can't think of one... which doesn't mean that there isn't one. I simply have never tried to do it. I would think that what you are trying to achieve is certainly possible but highly undesirable.

I never even recommend the use of battery powered cassette recorders, so the thought of a battery powered Spectrum does not exactly strike me as a good idea.

EDUCATION AT HOME

N. Davidson of South Shields, Tyne and Wear, writes:

Q Could you please tell me where I could purchase a book on assembly language programming for educational use? The majority of

books I checked were all on programming computer games. This is for use on the Spectrum 48K.

A By educational use I presume you mean your own education and not for use in a school. When asked this question I usually recommend *Spectrum Machine Language for the Absolute Beginner* published by Melbourne House, but I assume that as the case study in this book is *Frogger* that this is one of the books that you have already rejected.

In that case I would suggest that you contact Mine of Information Ltd, who are computer booksellers and have a large range of books on Z80 machine language programming. They can be contacted at: 1 Francis Avenue, St. Albans.

A BLANK SCREEN

Anon of Cobham, Surrey writes:

Q I own a Spectrum 48K. When I turn on I get a blank screen with no Sinclair Research 1982 and I cannot write anything on the screen. Please could you tell me what is wrong or who can I get to fix it?

A As you are writing to me, I guess that your Spectrum's guarantee has run out. In that case your best bet would be to contact TV Services whose address is: Cheston Mill, Frenches Road, Cambridge. They will repair your machine for a fixed price of £18.75. As to what is wrong with it... it's mere speculation, but how about the power supply? Does your machine get warm? If not then that is your trouble. If it does then the Rom has gone awry.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Pokes*, PCW, 12-13 Little Newport Street, London WC2R 3LD.

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Educational Computing and Software Fair	John Taylor Teachers Centre Leeds	June 18 2.30pm-7.30pm June 19 9.30am-7.30pm	Free	Mr G. Creighton John Taylor Teachers Centre 0532 782161
Micro Trade 84 (Trade only)	Barbican London	July 4-6 10.00am-6.00pm	Free	Montbault Ltd, 11 Manchester Sq, London W1 01-486 1951
What Micro? Computer Show	Battersea Park London	July 14-15 10.00am-7.00pm	£1.50	VNU Business Publications Evelyn House 62 Oxford Street London W1A 2HG 01-636 6890
Electron and BBC Micro User Show	Alexandra Palace London	July 19-21 10.00am-6.00pm July 22 10.00am-4.00pm	£3.00 adults £2.00 children	Database Publications 98 Chester Road Hazel Grove, Stockport 061-456 8383

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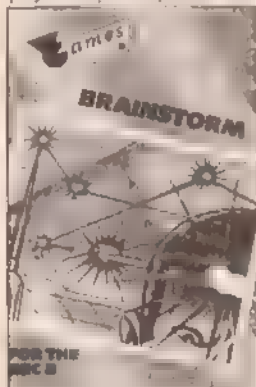
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Phone 01-661 9240 for enquiries.

BRAIN DAMAGE

Brainstorm is a clever strategy game for the BBC for two players — this can sometimes be a problem since a lot of computer owners don't have any friends.

The game involves thought rather than fast reactions and has the theme of defending your brain from attack by lasers. I can see how that might concern you.

It's very ingenious: each player can place a prism on the



game board which will deflect the opponent's laser, but cause his own to be deflected into the opposition. As more and more prisms are placed so the game becomes more and more difficult to play.

Scattered about the playing board are some random elements, electro prisms which have a random deflection — choose the wrong path and you can destroy your own brain.

Program *Brainstorm*
Price £7.95
Micro BBC
Supplier Virgin Games
61/63 Portobello Road
London
W11 3DD

TURNING TURTLE

Logo is a cartridge from Dragon data which offers a full implementation of the educational computer language perhaps best known for its association with turtles — the computer controlled robots.

Dragon definitely see this as an educational release and a number of special features are included purely for children — a doodle mode lets youngsters play with the program without needing to program.

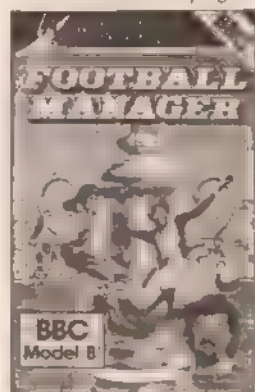
The substantial manual would suggest this is a very thorough implementation of the language indeed. Editing of procedures is line orientated and finished Procedures can be saved to tape. Multiple turtles are allowed as is a limited form of animation.

I should add that the manual although excellent in its way is definitely not for children — it's not so much that it's complicated, more that there are so many different permutations. The hundred and thirty or so pages of the manual are going to need some detailed and careful reading.

Program *Logo*
Price £39.95
Micro Dragon 32
Supplier Dragondata
Kenfig Industrial Estate
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DIVISION ONE

As Automata have also proved, Addictive Games has shown that it is possible to write excellent programs in Basic — *Football Manager* started life as a ZX81 program



ages ago and is still going strong.

The latest version is the most impressive yet; running as it does on the BBC B, the

Pick of the week

SENSE OF STRATEGY

Beach Head is a multi-screen arcade game that is very close to being perfect, graphically it is astonishing.

The idea is that you battle your way through to an enemy beach head via various sea battles. Stage one is to decide on your plan of attack through the mined strait or the easy way; the latter gives you a chance to sneak up on the enemy.

Assuming you get a few ships through, the main sea battle occurs with planes dropping bombs on you as you try to blast them with your ship's guns. The sound effects for the planes are particularly well done — you expect to see John Mills complete with stiff upper lip at any time.

Later stages have you fighting the ships and then using tanks to fight your way

to the enemy fortress. Each stage directly influences the next — the number of ships you get through determines the number of tanks, for example.

There are a vast number of features and beautiful detail (if you look really closely you can even see the aircraft taking off from the carrier). A sense of strategy is genuinely important, but even if you just like blasting away you'll have hours of destructive fun.

Program *Beach Head*
Price £9.95
Micro Commodore 64
Supplier US Gold
Access Software
Unit 24 Tipton
Trading Estate
Bloomfield Road
Tipton
West Midlands
DY4 9AH

action is fast and the animated football sequences most impressive. On the BBC the little men have evolved from matchsticks to Subbuteo figures. Another addition is the provision of a fixture list which you can consult.

Apart from that, it only remains to summarise the game for those people who don't know it. As a football manager you choose the teams buying the players, deciding who to play, keeping morale high and basically living out your footballing fantasies as you try to move your team up the divisions.

Matches are decided according to a vast number of factors, only one of which is luck, and you get to see the highlights of each game.

Quite honestly, John, I think you're going to be over the moon about this one unless you're strictly TT on footballing matters in which case you'll probably be sick as a parrot, squire.

Program *Football Manager*
Price £7.95
Micro BBC B
Supplier Addictive Games
7A Richmond Hill
Bournemouth
BH2 6HE

HYSTERICAL RATS

Encounter is a pretty wonderful new program for the Commodore 64 loosely based on the old favourite *Battlezone*. *Encounter* is actually an improvement on the original because the 3D graphics are no longer simple line drawings — they are filled in to give them a real sense of substance.

The aim of the game is to track and destroy baddie spaceships which are diamond shaped and lurch erratically like hysterical rats when you try to fix your sights on them.

Every so often retaliation comes in the form of an Exocet like missile that hurtles towards you — you get about three seconds to hit it. Survive long enough and you may find the gateway to the next level via a tunnel of spheres (dodge them) which looks a bit like some of the sequences at the end of 2001. Very psychedelic.

The sense of 3D landscape is beautifully done and very evocative — bleak plains with featureless black obelisks scatter over them, distant mountain peaks. If only they'd ma-

New Releases

naged to do Ligetti's music on the Sid chip. . .

Program *Encounter*
Price £9.95
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213 Broad Street
Birmingham
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TAX LOSS

Nifty Lifty is another arcade game for the BBC from Visions Software who seems to be specialising more and more in the Acorn machine.

The plot has vague overtones of *Catcher Snatcher* — you are a shoplifter (except that the shop management



don't object to your taking the stuff — perhaps it's a tax loss).

The problem in the game is to avoid the lifts which threaten ■■ ■■ ■■ as you move from floor to floor. Not a lot to say other than that it's got continuous sound (even when loading). 15 levels and is in machine code.

Program *Nifty Lifty*
Price £9.95
Micro BBC B
Supplier Visions
Software Factory)
1 Felgate Mews
Safford Street
London W6 9JT

SOOTHSAYER

Operation Roman Gaul is a graphics adventure with 30 illustrations and a vocabulary of

200 words. You play Ajax the well known cleaner and hero who begins held aboard a Roman Galley and is commissioned ■■ locate a soothsayer.

■ must be one of the few Spectrum adventures I've seen recently not written with the *Quill* — it deserves a mention because of that if nothing else.

The graphics are simple but OK and the general not taking itself too seriously of the adventure ■■ quite entertaining. At a current price of £4 ■■ could be good for the not overly ardent adventurer.

Program *Operation Roman Gaul*
Price £4
Micro Spectrum
Supplier Specsoft (Dept 1)
57 Everard Avenue
Sheffield S17 4LY

REWRITTEN RULES

Some chess aficionados are going to find the idea of *Death Chess 5000* pretty suspect. For one thing, the playing pieces are tanks and helicopters, rather than horses and bishops; far worse though, Artic, who manufacture the game, have rewritten the rules of chess.

In *Death Chess* you don't just capture a piece by moving from your square to another square — you have to battle ■■ out. There are six arcade sections ■■ which the battles take



place along the usual up, down, left, right, hang rules. Thus it is possible that despite moving your piece onto an enemy piece square as the final flourish of a daring two

pronged attack, the enemy may remain and your own piece may be lost if you blow it in the arcade section.

An 'interesting and unusual' departure from chess says the Artic blurb. Hmmmm. Well, it might be good for getting kids interested in this ancient and venerable game.

Program *Death Chess 5000*
Price £6.95
Micro Spectrum
Supplier Artic Computing
Main Street
Brandsburton
Driffield
YO25 5RL

BANKRUPT

The Chocolate Factory is a 'run a business' game for the Dragon 32 for two to six players. The idea is, as ■■ the real world, to run a business and make a lot of money (10 million) or let everybody else go out of business.

This is a quite complex simulation with factors like van hire, staff, advertising, insurance, etc. being taken into account. The problem as I see it is that you must not let your competitors (the other players) see what decisions you are making. This means persuading everyone not to look at the TV screen when you type in your figures. Knowing the deep corruption prevalent in most families this seems unlikely.

Program *The Chocolate Factory*
Price £6.95
Micro Dragon 32
Supplier Minis
Strand House
Great West Road
Brentford
Middle TW8 9EX

JETS AWAY

Quite nice educational idea from Calpac this: *How Machines Work* uses the Spectrum to explain the working of both a Harrier jet and a car.

Various functions are discussed and illustrated using high res graphics and animated sequences. There is also a large amount of text explain-

ing the history, development, etc. of both machines.

Program *How Machines Work*
Price £6.95
Micro Spectrum
Supplier Calpac Computer
Software
108 Hermitage
Woods Crescent
St Johns
Woking
Surrey GU21 1UF

DEADLY RAYS

The CGLMS (Sord) is really not a bad computer, but it can't be said to have been a success ■■ this country. Still, some people out there own



one so I thought ■■ about time I mentioned some software for it.

Devil Bird ■■ a fairly accurate version of that old arcade favourite *Phoenix* in which large birds flap down at you firing the usual deadly rays; at later stages the birds become invisible which adds to the fun. It's very unoriginal, but good enough fun.

Program *Devil Bird*
Price £5.95
Micro CGLMS
Supplier CGL
CGL House
Goldings Hill
Loughton
Essex IG10 2RR

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2A 3LD.

Vic 20

- (1) Duck Shoot
- (2) Crazy Kong
- (3) Tank Commander
- (4) Chariot Race
- (5) Computer War
- (6) Sub Commander
- (7) Jet Pac
- (8) Grindrunner
- (9) Mutant Hard
- (10) Tower of Evil

Master Tronics
Interceptor Micro
Thorn EMI
Micro Amics
Thorn EMI
Thorn EMI
Ultimate
Lamasoft
Thorn EMI
Thorn EMI

Commodore 64

- (1) Mario Miner
- (2) BMX Racers
- (3) Black Hawk
- (4) Space Pilot
- (5) Space Walk
- (6) Arena 3000
- (7) City Attack
- (8) Cosmic Convo
- (9) Road Toad
- (10) Hammer Attack

Software Products
Master Tronics
Thorn EMI
Analog
Master Tronics
Microdeal
K-Tel
Taskset
AudioGenic
CBM

(Figures compiled by Boots/Websters)

Dragon 32

- (1) Chuckie Egg
- (2) Cuthbert in Space
- (3) King's Quest
- (4) Eightball
- (5) Hungry Horace
- (6) Ugh
- (7) Up Periscopes
- (8) Scumbe
- (9) The King
- (10) Pedro

A & F Software
Microdeal
Beyond
Microdeal
Melbourne House
Softest
Beyond
Microdeal
Microdeal
Imagine

(Figures compiled by Boots/Websters)

ZX81*

- (1) Krazy Kong
- (2) Krypton Oreol
- (3) Walk the Plank
- (4) Plural Reader
- (5) Asteroid
- (6) Scribble
- (7) Black Crystal
- (8) Flight Simulation
- (9) Alien Rain
- (10) Chess 1K

PSS
Novus
Novus
Novus
Quicksilver
Quicksilver
Carnell Software
Sindair
CPL
Sindair

(Figures compiled by Boots/Websters)

*All 16K except where indicated 1 K.

Books

- (1) Sinclair Q1, Companion, Allen
- (2) Step by Step Programming Spectrum Book 2, Graham
- (3) 60 Programs for the Commodore 64, Ertel et al
- (4) Commodore 64 Programmers' Reference Guide, Commodore
- (5) Step by Step Programming Spectrum Book 1, Graham
- (6) A Guide to Playing the Hobbit, Ertel
- (7) Spectrum Sound and Graphics, Money
- (8) Commodore 64 Games Book, Bishop
- (9) Easy Programs for the Commodore 64, Stewart and Jones
- (10) Very Basic, Basic Spectrum, Elton and Schofield

Pitman
Dorling Kindersley
Pan
Commodore
Dorling Kindersley
Melbourne House
Grandads
Granada
Shiva
Century

Spectrum*

- (1) Jet Set Willy
- (2) Zaxxon
- (3) Hunchback
- (4) Blue Thunder
- (5) Fred
- (6) Trashman
- (7) Checkered Flag
- (8) Alchemist
- (9) Cricket Captain
- (10) Whelias

(Software Projects)
(Scazone)
(Ocean)
(Foundry Systems)
(Quicksilver)
(Pison)
(Pison)
(Imagine)
(Atkinson)
(Microsphere)

* All 48K
(Figures compiled by W H Smei and Son, London)

Atari

- (1) Solo Flight
- (2) Rally Speedway
- (3) Warlock
- (4) Saga 4 Voodoo Castle
- (5) Caverns of Kalika
- (6) Sinky
- (7) AirStrike 2
- (8) Captain Sticky's Gold
- (9) A.C.E.
- (10) Zork II

(English)
(Adventure International)
(Calisto)
(Adventure International)
(Cosmi)
(Cosmi)
(English)
(English)
(English)
(English)
(InfoCom)
(InfoCom)

* Cartridge \$ 32K Disc \$ 48K Disc \$ 32K Cassette
(Figures Compiled by Calisto Computers 021 632 6456)

BBC*

- (1) Bigger
- (2) Aviator
- (3) Pengl
- (4) Fortress
- (5) Liberator
- (6) 30 Munchy
- (7) German Linkword
- (8) Spooks and Spiders
- (9) Twin Kingdom Valley
- (10) French Linkword

(Alligata)
(Acomsoft)
(Viscon)
(Pace)
(Gerni)
(Gerni)
(Acomsoft)
(Software Invasion)
(Bug Byte)
(Acomsoft)

* All model B
(Figures compiled by Micro Management 0473 59181)

PUZZLED

Brainteasers for the Dragon 32 is a collection of puzzles of various kinds for people who enjoy such things. In fact, the increasing number of such books leads me to suppose that computer puzzles must be the current wave.

This book has some particularly good and varied puzzles — many of them with some pretty good graphics. The diverse nature of the puzzles means that more or less every type of mental skill is tested; something for everyone.

Book *Brainteasers for the Dragon 32*
Price £5.95
Micro *Dragon 32*
Supplier Phoenix Publishing Associates
14 Vernon Road
Bushey
Herts WD2 2JL

FAST FOOD

I have no idea why *The Last Vic20 Book in the World* has the title it does, maybe the publishers know something either about the Vic20 or worse still about the world that I don't. The book is a collection of educational programs.

Listing books are usually the fast food in what should be the gourmet meal that is computer

book publishing. However, within the constraints of 3-5K (all but two of these programs will fit into the unexpanded machine) all of these programs are pretty useful and there are good notes on how to use them.

Book *The Last Vic20 Book in the World*
Price £5.95
Micro *Vic20*
Supplier Sigma Technical Press
5 Alton Road
Wilmstow
Cheshire SK9 5DY

DESPAIR

Games Commodore 64 Computers Play is one of those collections of listings that fill the heart of all book reviewers with despair. What on earth do you say about the damn thing?

If you want a collection of programs to type in, then these are probably better than most and the choice and variety is far greater than usual.

I guess this is better than most, but it's very difficult to get enthusiastic about such books.

Book *Games Commodore 64 Computers Play*
Price £6.95
Micro *Commodore 64*
Supplier Addison Wesley
53 Bedford Square
London WC1

This Week

Program	Type	Micro	Price	Supplier
Word Search	Ed	Atmos	£8.95	CDS
Disassembler	Ut	BBC	£3.50	Crystalsoft
Egg the Upgrade	Ut	BBC	£3.50	Crystalsoft
Incredible Hunt	Ad	BBC	£9.95	Adventure International
1984	S	BBC B	£6.50	Incentive
Manage	S	BBC B	£6.95	CCS
Denle	Ad	Commodore 64	£5.50	Applications
Incredible Hunt	Ad	Commodore 64	£9.95	Adventure International
Chuckie Egg	Arc	Commodore 64	£7.90	A&F Software
Heathrow	S	Commodore 64	£7.95	Hewson
Lewdo	Ad	Commodore 64	£6.95	Twilight
Pac man	Arc	Commodore 64	£24.99	Atari
Splatt	Arc	Commodore 64	£6.50	Incentive
Star Trooper	Arc	Commodore 64	£6.95	Melbourne House
Hi Res Draw	Ut	Dragon 32	£5.95	Elkington
Screen Dumps	Ut	Dragon 32	£4.50	Elkington
Astrocode	S	Spectrum	£4.99	Finsbury
Complete Machine Code Constructor	Ed	Spectrum	£14.99	New Generation
Escalator Loco	Ed	Spectrum	£5.95	Ventemac
Froot Loop	Arc	Spectrum	£3.00	NTD
Incredible Hunt	Ad	Spectrum	£9.95	Adventure International
Mailis Utilities	Ed	Spectrum	£8.95	Solway
Pop Quiz	S	Spectrum	£5.75	Bellflower

Prince/Princess	Ad	Spectrum	£5.95	Finsbury
Spectune	Ed	Spectrum	£5.95	XOR
Tank Duel	Arc	Spectrum	£5.50	Realtime
Tuneles Marclanos	Arc	Spectrum	£5.95	Ventemac
Wreckage	Arc	Spectrum	£5.95	Ventemac
Pac man	Arc	Ti 99/4a	£24.99	Atari
Donkey Kong	Arc	Ti 99/4a	£24.99	Atari
Amazonian Quest	Ad	Vic20	£5.00	Tony Runeskeys
Haunted House	Ad	Vic20	£5.00	Tony Runeskeys
Pac man	Arc	Vic20	£24.99	Atari
Pharaoh's Curse	Ad	Vic20	£9.95	Thorn EMI
Robotron	Arc	Vic20	£19.99	Atari
Swordquest	Ad	Vic20	£5.00	Tony Runeskeys

Key: Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



Mainframe power

Ever since my last Ziggurat, people eagerly asking what it's like to play *Life* and suchlike silly games using the awesomely powerful mainframe computers of the Ministry of Defence. Believe me, when I was there in 1980 it was pretty amazing. Some hint of the sheer technological sophistication of it all may be given by the following extract from my novel of life in a wholly imaginary MOD nuclear-research place — *The Leaky Establishment*, published in June by Frederick Muller Ltd at a trifling £8.95 (plug, plug)...

"Llewellyn hit a control key to stop the remorseless printout, tore off and wadded up several furlongs of paper, and stuffed the result into the bin. "Think it's working now. Got it from one of the programmers in T section, he spent weeks adapting it for grotty old terminals like this. Really triff — look..."

He typed a line of command language. The teletype resumed its tatta-tatta- tatta-tatta, like a high-speed replay of bad disco music, or the military band accompaniment for a regiment on the run. It was printing clumps of asterisks, row after row, tatta-tatta-tatta-ching at the end of every line, the whole building up with painful slowness into a picture, 10 columns of six little asterisk- clumps whose shape had a kind of familiarity. Several blank lines beneath the bottom of this was a final shape built from stars, a small centred triangle, and below that: TYPE L TO MOVE LEFT; R TO MOVE RIGHT, F TO FIRE MISSILE

With a triumphant flourish, Llewellyn typed FL, and the chattering began anew. Tappen's

eyes widened in realization as the fresh picture built up on a fresh yard of paper, the suddenly all too recognizable shapes above, the triangle at the bottom now shifted slightly left, a lonely asterisk above it to represent a missile on its soaring upward course...

"Bet you this is the first Space Invaders game to run on a teletype," said Llewellyn with considerable pride.

"Science," Tappen said reverently, "is wonderful. Just how many centuries does it take to finish a game?"

"Well, this wally from T said it was a good idea to come in early in the morning. Done better than him though, I've patched the program so you can stop any time and start next day or whenever, just where you left off. Play it right through even if it takes you two weeks. Pretty brill, eh?"

"Slug Invaders," Tappen intoned, slightly limp from this revelation of wonders. "Glacier Invaders."

The teletype completed another picture. At this rate Llewellyn's missile would very likely find its target by lunchtime. But instead of unleashing his deadly reflexes on the fire control, he turned his head to squint over one shoulder, up at Tappen. "Let me just finish the game and I'll show you..."

"You are not finishing that bloody game!"

"Worry not, Roy. I'm ahead of you. Said I'd been improving the thing, didn't I? You look at this." More control keys. More clatter.

*** IN AUTOMATIC MODE *** (said the teletype.)

"Autopilot — no need for printout or key-pushing — plays right through the game for you and..."

*** GAME OVER ***
YOU HAVE BEEN UTTERLY DEFEATED. THE ALIENS HAVE OVERUN EARTH!!!
YOUR SCORE WAS 262.939.415000
TYPE R IF YOU'D LIKE ANOTHER GAM

"I see your programming's going through a bad spell," said Tappen...

And that, Best Beloved, was what it was like to be a scientific civil servant with power over the mighty mainframes of the MOD. I bet you're all just grinding your teeth to powder in envy of such privileged status, aren't you? Er, excuse me one moment, there seems to be this large man from MI5 at the door...

David Langford

Wiped out!

Puzzle No 111

The homework had been written on the blackboard but, unfortunately, when the class came to write it down, three of the digits had been accidentally erased and the teacher had gone.

7 86 54

They knew that they had to divide the eight digit number by both 13 and 17, in each case the division worked out exactly.

One of the class was certain that one of the missing digits was '3', but apart from this they were no wiser.

Can you help them?

Solution to Puzzle No 106

Each time ten millilitres are removed from a litre bottle the amount of brandy is reduced by one per cent of its previous volume. Thus the volume remaining can be calculated by multiplying the previous volume by 0.99. This is repeated until this volume falls to below half (500 ml.)

10 VOL = 1000 20 LET NIP = 1 30 LET VOL = VOL * 9.98 40 PRINT NIP, VOL 50 IF VOL < 500 THEN STOP 60 LET NIP = NIP + 1 70 GOTO 30

If this is run the program stops after NIP = 69. However, we need to determine at which point the volume of brandy remaining was nearest to 500 ml.

We see that when NIP = 68 the volume was 504.88588 ml, and when NIP = 69 the volume was 499.837022. Of these the second is closest so Algernon had made 69 visits.

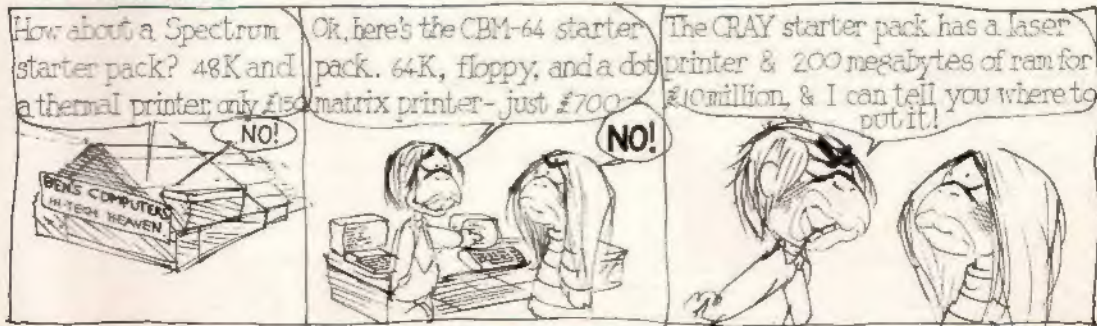
Winner of Puzzle No 106

The winner is M Armstrong, 20 Mill Road, Abingdon, Oxon, who receives £10.

Rules

The closing date for entries to Puzzle No 111 is June 29.

The Hackers



PILAND Meets RUSSIA: Part 2

THE PIMAN HAS BEEN ASSIGNED TO A MISSION OF OLYMPIC RECONCILIATION IN MOSCOW, WITH HIS PINOQUADIAN PAL, RASTAPIMAN, WHO IS TRYING TO WIDE HIS DREDDLOCKS BEHIND HEAVY DISGUISE. THEIR ESCORT IS THE BEAUTIFUL COMRADE GEREMUFF...

GO EASY ON COMRADE SUBORANICH - HE'S GOT A BIT OF A HEAD TODAY

BURK BURK

COMRADE? I THOT WE WAS GOAN TO SHEE DE PRIME MONSTER!

YEAH

SOMEBODY WHOLCKSKI?

HYA, MATE... I MEAN, COMRADE! I'M THE PIMAN FROM ENGLAND!

GREETINGS, COMRADE PIN-MAN... ER... WHO WAS DAT OTHER FELLOW?

HEY, PIMAN, YOU TOK TO DIS RUSK, AN I'LL FIX IT WITH THE PRIME MONSTER!

GREAT! SEEYA!

FOOLISH

OH, THAT'S MY RIGHT-ER- I MEAN LEFT-HAND MAN - RASTAPIMAN!

BETTER LET 'EM KNOW I CAN TAKE ME VODKA!

RASPUTIN?

IT COULDN'T BE THE MAD MONK - THAT MAN WAS SO SMALL AND DARK... BESIDES, IF HE WAS ALIVE, HE'D BE ABOUT 113 YEARS OLD!

OF COURSE! THAT'S WHY HE IS SO SHRUNKEN - BUT THIS TIME WE WILL DESTROY THE DEVIL!

WHAT ARE YOU GUYS GETTING YOUR COMRADE-KNICKERS IN A TWIST FOR?

YOU OBVIOUSLY DO NOT REALISE THAT YOU WERE HARBOURING A VIPER IN YOUR BOSOM...

FILTHY TALK!

BUT IT IS IN HAND NOW... SO WHAT CAN WE DO FOR YOU?

CHUMS, I CAME TO SEE YOUR LEADER... TO APPEAL TO HIM TO JOIN THE '84 OLYMPICS AGAIN... BECAUSE THE IDEA OF THE GAMES IS TO UNITE THE PEOPLES AND THE PEOPLES OF THE WORLD!

WICK!

YES - PUT OUT A GENERAL ORDER TO SHOOT ON SIGHT!



AH, POOR LITTLE PINK COMRADE! DO YOU BELIEVE WE ARE HAPPY WITH THIS OUTCOME? I HOPE YOU DON'T UNDERSTAND - WILL NEVER UNDERSTAND - THE FOLLIES OF 'HUMAN' NATURE.

BRANKA-BRANKA-BRANKA

OH WELL, I THINK I'LL HAVE ANOTHER OF THESE PICKLED GORKIES!

GOOD LORD - WHA-HA-SAT?

OH - JUST SOME-BODY TRYING TO PUT RASPUTIN!

RASPUTIN! NO - I SAID RASTAPIMAN - ME BLACK BUDDY FROM PINIDAD!

BUFFOON - THE ONLY BLACK RUSSIAN IS CIGARETTES!

WELL, MY BUTT'S SHO' SMOKIN' NICELY!

COME ON, WE'RE GONNA THANKS ANYWAY, COMRADES!

BUT THERE IS NO PLANE UNTIL TOMORROW NIGHT!



LATER

I'M DROPPING OUT OF THE GAMES TOO, ANYBODY WHO WANTS TO SEE ME PERFORM HAD BETT'ER FILL OUT THIS FORM AND GET 'OLYMPIMANIA' - A PROGRAM FULL OF FUN FOR ONLY 59c BUD!

BUT WAIT YOU SNEEPPIN' DOWN?



OH - IT'S TALKS CASHING - IN THE GAMES - DETEST!

POST-YERSELF ORDER FORM DEFT. (CZECHS ACCEPTED!)

'OLYMPIMANIA' - He's back - he's going for gold! £6 He's sober! Free National Anthem on Flipside. (SPECTRUM 48K)

I ENCLOSE THE RIGHT MONEY, OR DEBIT MY ACCESS/VISA CARD

CARD NUMBER _____

MY SIGNATURE _____

MY NAME _____

MY ADDRESS _____

POST CODE _____

NO EXTRAS! (UNLESS WE EVER GET TO MAKE A MOVIE AND NEED SOME FOR OUR GRAND SCENES) ALL PRICES INCLUDE DELIVERY AND V.A.T. SEND TO: AUTOMATA U.K. LTD 27, HIGHLAND RD, PORTSMOUTH, HANTS PO8 9DA

IN CASE YOU WERE WONDERING WHY COMRADE GEREMUFF GOT A PARTY ON THIS AND ONLY ONE!



